HP ProLiant SL Advanced Power Manager User Guide

Abstract

This guide provides installation and operation guidance for the HP ProLiant SL Advanced Power Manager. This guide is for the person who installs, administers, and troubleshoots servers and storage systems.

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Introduction

SL-APM overview

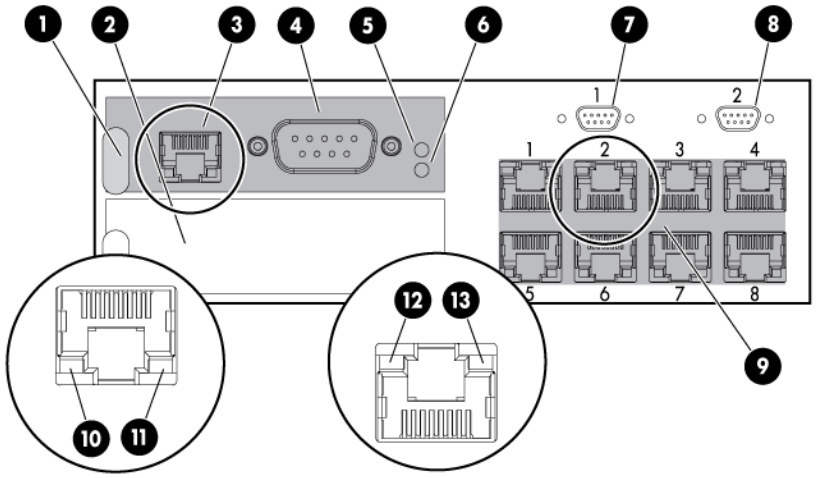
SL-APM is a single point of contact for HP ProLiant Scalable System administration.

SL-APM enables:

- Discovery of server rack components by topology
- Node-level power monitoring and control
- Easy node and identification through UID indicators
- Support of logging through standard syslog servers
- The Power Capping Feature for chassis and rack levels—Supported for HP ProLiant s6500 Chassis and later versions only with BIOS and Power Management Controller (SL Chassis) enclosure firmware 4.3 or later. The Power Capping Feature is not supported for HP ProLiant DL1000, DL2000, and SL6000 Chassis

SL-APM supports all HP SL chassis.

SL-APM front view



Item	Description
1	SL-APM controller slot 1
2	SL-APM controller slot 2
3	10/100 network interface
4	Serial console
5	Power (green) LED
6	Fault (red) LED

Item	Description
7	PDM1 for HP Intelligent Modular PDU Extension Bar
8	PDM2 for HP Intelligent Modular PDU Extension Bar
9	SL-APM Distribution Module ports (see Caution below)
10	Network interface 100mb activity (amber) LED, indicates that the link is in 100Base-T mode and blinks when transmitting or receiving data. When the link is 10mb, the LED does not illuminate.
11	Network interface connection (green) LED, indicates that the Ethernet link is established
12	Distribution Module port connection (green) LED, indicates that SL-APM Distribution Module is connected to the port
13	Distribution Module port activity (green) LED, indicates that there is activity between the SL-APM and the SL-APM Distribution Module

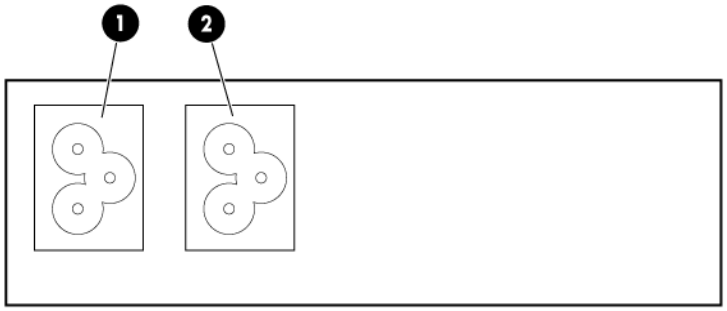
△ **CAUTION:** Do not connect the SL-APM Distribution Module port (item 9) to an Ethernet hub or switch.

NOTE: HP recommends configuring the SL-APM so that it controls only one rack.

SL-APM has eight distribution module ports on the front of the unit. Each distribution module port, in turn, connects to a port on a SL-APM Distribution Module, which has up to 10 connections to SL Scalable System enclosures.

You can insert a SL-APM controller into either available slot.

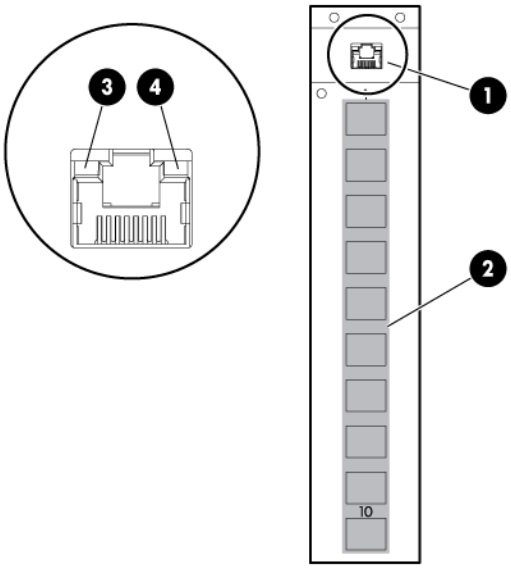
SL-APM rear view



Item	Description
1	AC power input 1
2	AC power input 2

HP ProLiant SL Advanced Power Manager Distribution Module

The distribution module includes a connector bay for the SL-APM and cables for SL Scalable Series servers.

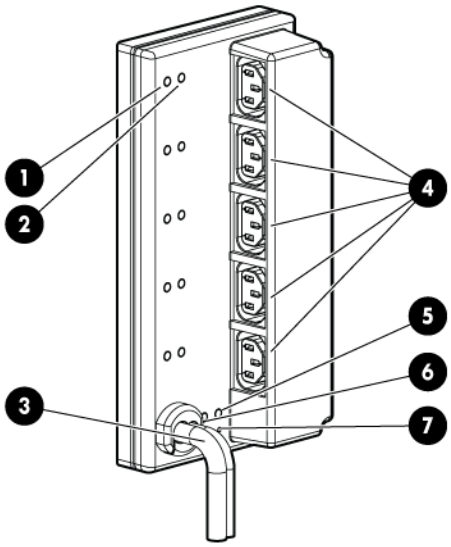


Item	Description
1	SL-APM connector port
2	SL Scalable Series server connectors
3	Power (green) LED, which indicates connection to port
4	Activity (amber) LED, which indicates activity to SL-APM Distribution Module

HP Intelligent Modular PDU Managed Extension Bar

The extension bar provides power management for non-SL enclosures (switches, routers, and so on). The extension bar, when used with the HP cable part number SF672A and SL-APM, is not intended for power management of SL enclosures.

The total rating of the Intelligent Extension Bar is 16 A.



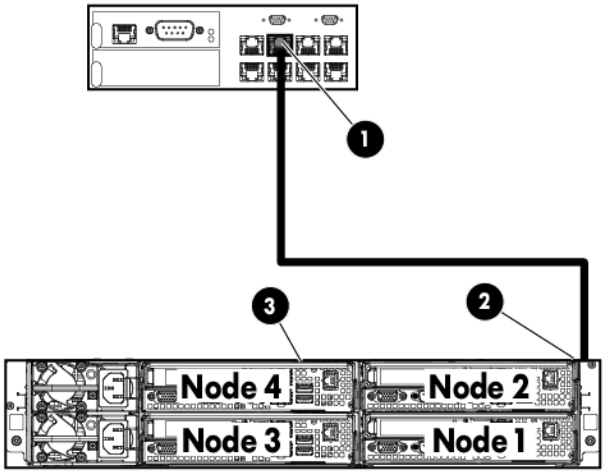
Callout	Description
1	Row of green power indicators (one for each outlet)
2	Row of blue UID indicators (one for each outlet)
3	2.4-m (8-ft) input power cord
4	Five managed 10 A, IEC-320 C13 outlets
5	Blue UID indicator for the Intelligent Extension Bar
6	Green power indicator for the Intelligent Extension Bar
7	Reset button*

*When you press the Reset button, power to the managed outlets is maintained. Management functionality is momentarily lost while the Intelligent Extension Bar resets.

Naming and numbering conventions

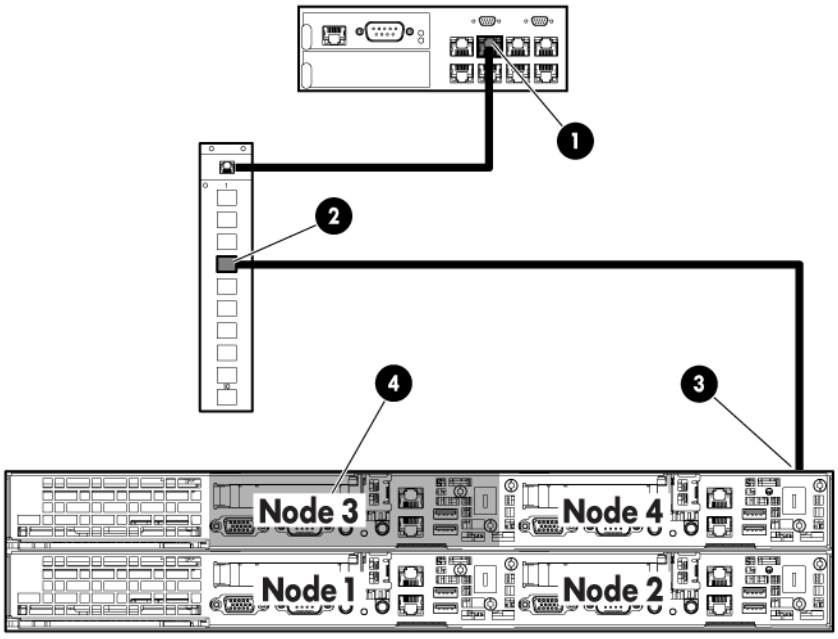
The following figures show basic SL-APM configuration and node numbering conventions on various scalable system enclosures.

2U-chassis, DL2000 Scalable System Enclosure with four half-width 1U nodes



Item	Description
1	SL-APM
2	DL series enclosure
3	Bay 4 of a 2U-chassis, DL2000 Scalable System Enclosure with four half-width 1U nodes

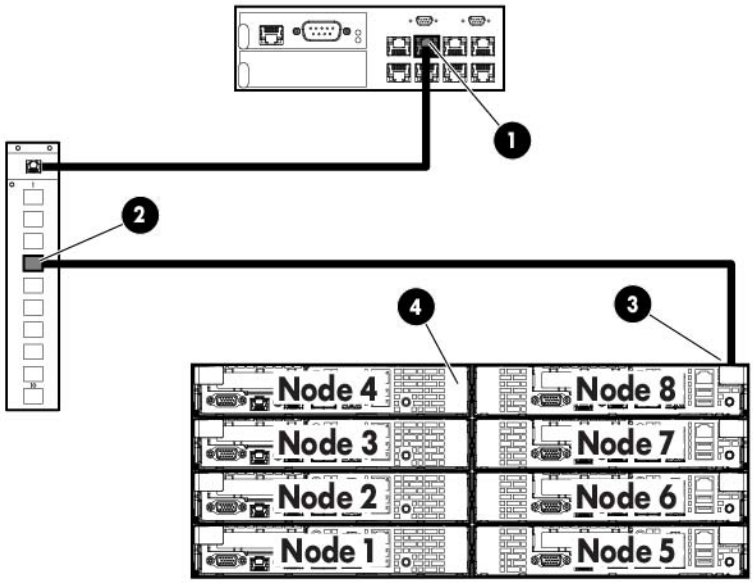
2U-chassis, SL6000 Scalable System Enclosure with four 1U half-width nodes



Item	Description
1	SL-APM
2	SL-APM Distribution Module
3	SL series enclosure

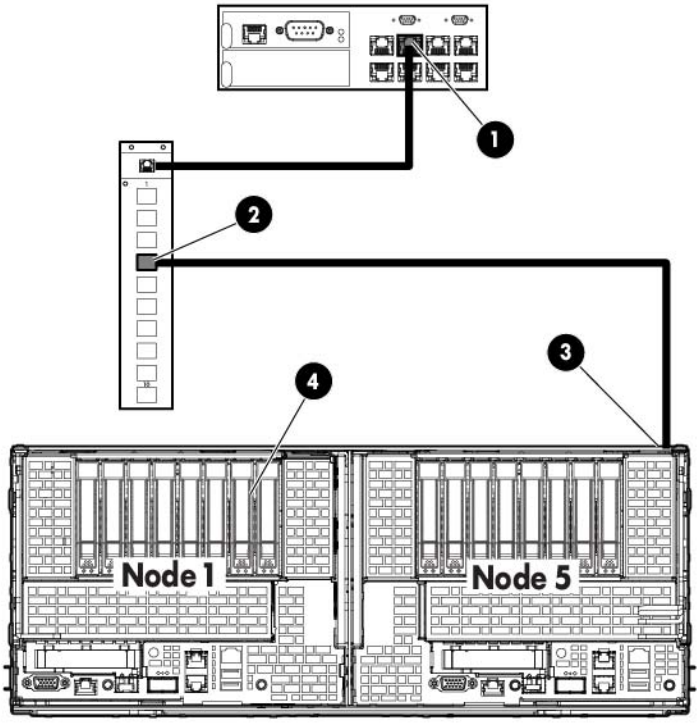
Item	Description
4	Bay 3 of a 2U-chassis, SL6000 Scalable System Enclosure with four 1U half-width nodes

4U-chassis, s6500 Scalable System Enclosure with eight 1U half-width nodes



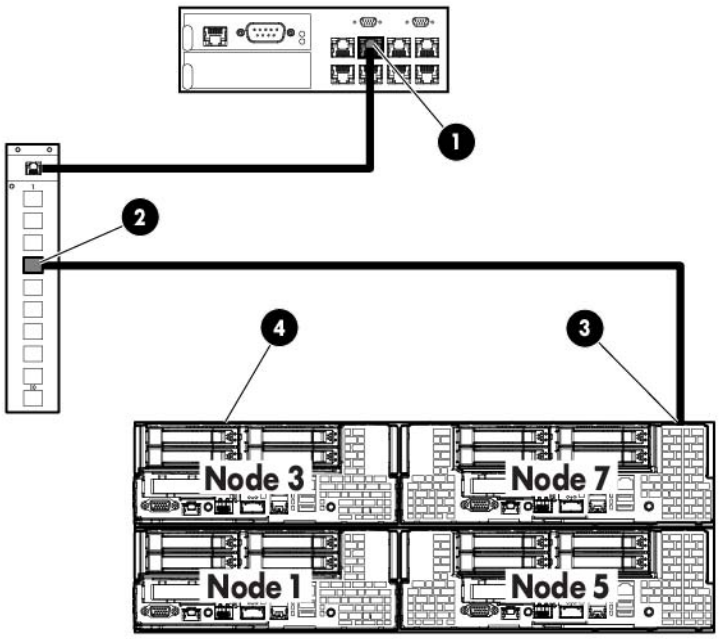
Item	Description
1	SL-APM
2	SL-APM Distribution Module
3	SL series enclosure
4	Bay 4 of a 4U-chassis, s6500 Scalable System Enclosure with eight 1U half-width nodes

4U-chassis, s6500 Scalable System Enclosure with two 4U half-width nodes



Item	Description
1	SL-APM
2	SL-APM Distribution Module
3	SL series enclosure
4	Bay 1 of a 4U-chassis, s6500 Scalable System Enclosure with two 4U half-width nodes

4U-chassis, s6500 Scalable System Enclosure with four 2U half-width nodes



Item	Description
1	SL-APM
2	SL-APM Distribution Module
3	SL series enclosure
4	Bay 3 of a 4U-chassis, s6500 Scalable System Enclosure with four 2U half-width nodes

When entering commands that require specific port and node numbers, use the SL-APM port number, SL-APM Distribution Module port number, and the SL server node number.

For example, to turn on the power for SL server node 3 that is connected to SL-APM Distribution Module port 4, which, in turn, is connected to SL-APM port 2, enter the following:

```
SET POWER ON 2 4 3
```

where:

`2` is the SL-APM port.

`4` is the SL-APM Distribution Module port.

`3` is the SL server node.

Parameters must have spaces between them.

Automatic discovery

SL-APM employs an automatic discovery process that identifies all SL series servers in the attached enclosures.

The discovery process also has a simple fault detection mechanism. If any node has faults detected (for example, power supply failure), the discovery response data reports the fault. For a list of alert messages, see "Alert messages (on page 58)".

Installation and configuration

Prerequisites for installation

The SL-APM can be administered through the serial console. Initial configuration requires a serial terminal set to 115200.

Preparing for installation

1. If you are not using a DHCP server, have your necessary IP address information available that will be used to access the SL-APM.
2. Secure a serial terminal, which is required for the initial setup of the SL-APM.
3. To use a remote logging server, verify that a remote syslog server and the IP address for connecting to the remote syslog server are available.

Installing the SL-APM hardware

To install the SL-APM, see the SL-APM installation instructions that accompany the option kit.

To install the SL-APM Distribution Module, see the installation instructions that accompany the option kit.

To install the HP RJ45 SL Advanced Power Manager Option Module, see the instructions in the HP RJ45 SL Advanced Power Manager Option Module Kit.

To install the HP Intelligent Modular PDU Extension Bar for use with the SL-APM, see the SL-APM installation instructions that accompany the SL-APM option kit.

Configuring the SL-APM for the first time

Both the serial and Ethernet devices on the SL-APM provide access to the CLI. The CLI is the only mechanism provided for SL-APM administration.

SL-APM must be configured before SSH and Telnet administration is made available. Initial configuration of the SL-APM requires a terminal set to 115200 bits/s, no parity, 8 data bits, and one stop bit (“115200 N 8 1”).

Configuring the SL-APM

When you boot up, a `LOGIN` prompt appears. Enter `Administrator` as the user account:

```
Login: Administrator
```

You can initially configure the SL-APM in the following ways:

- Enter `CONFIG` to use the simplified configuration wizard. The wizard provides you with a step-by-step process for configuring SL-APM. This procedure is for new users.

- Enter the commands manually. This procedure is for advanced users who want more control over the configuration process.
- Duplicate the configuration. For more information, see "Duplicating the configuration (on page 18)."

Using the configuration wizard

When you enter `CONFIG`, you are prompted to complete the following tasks.

1. Set the onboard clock—If you select Y, you will be prompted to enter:
   - Month—Enter a value between 1 to 12. Press **Enter**.
   - Day—Enter a value between 1 to 31. Press **Enter**.
   - Year—Enter the year (value must be four digits). Press **Enter**.
   - Hour—Enter a value between 0-23. Press **Enter**.
   - Minutes—Enter a value between 0-59. Press **Enter**.
2. Name the power manager—If you select **Y**, enter a name for the power manager. System names can be up to 80 characters. It can include uppercase letters, lowercase letters, underscores (_), dashes (-), the dollar sign ($), and numerical values between 0-9. To save the power manager name, press **Enter**. Naming the SL-APM is optional. This is the name that will appear in log entries on the syslog server as well as the CLI prompt.
3. Enable password protection—SL-APM has no default password. If you select **Y**, enter a password. The password must be between 8 and 40 characters, and can include:
   - uppercase letters
   - lowercase letters
   - underscores (_)
   - dashes (-)
   - at signs (@)
   - pound signs (#)
   - carets (^)
   - ampersands (&)
   - exclamation points (!)
   - plus symbols (+)
   - equal symbols (=)
   - tilde (~)
   - numerical values between 0–9

   To save and enable the password, press **Enter**. For more information about working with passwords, see "Working with passwords (on page 45)."
4. Configure the Ethernet port.
5. Use DHCP.
6. Enter an IP address.
7. Enter an IP address mask.
8. Enable Telnet.
9. Enable SSH.
10. To review the enabled configuration before saving it, select **Y**.

11. Save the new configuration. To save the new configuration, select **Y**. All settings relating to the SL-APM Ethernet and serial interfaces are persistent and stored in the SL-APM.

Serial port configuration

Verify that the client matches the following settings:

- Baud rate—115200
- Data bits—8
- Stop bits—1
- Parity—None
- Flow control—None

To set a different serial baud rate, enter `SET SERIAL <BAUD_RATE>`, where `<BAUD_RATE>` is the baud rate setting to be used.

A change in the baud rate immediately takes effect. You must change the settings on your client to match the settings on the SL-APM.

Network configuration

The SL-APM enclosure has two MAC address labels, one for each slot. The MAC address is slot-specific. You might need the MAC address when you configure the DHCP server to access SL-APM. To view the MAC address, enter `SHOW INFO`. For more information, see "Showing configurations (on page 50)."

Configuring Ethernet network access

To enable Ethernet network access, enter `ENABLE ETHERNET`.

To disable Ethernet network access, enter `DISABLE ETHERNET`.

Setting a static IP address

To set a static IP address and subnet mask, enter `SET IP <ip_address> <subnet_mask>`, where `<ip_address>` is the IP address and `<subnet_mask>` is the subnet mask.

To return to DHCP, enter `SET IP DHCP`.

Setting the network default gateway

To set the network default gateway enter `SET GATEWAY <ip_address>`, where `<ip_address>` is the IP address. SL-APM always uses the IP address, subnet mask, and default gateway.

To clear the gateway, enter `SET GATEWAY NONE`.

Showing the IP address

To show the IP address, enter `SHOW IP`. The following information appears:

- IP Address appears in x.x.x.x format
- IP Mask appears in x.x.x.x format
- Gateway appears in x.x.x.x format

Verifying network communication

To verify the network communication is working, enter `PING <IP address>`, where `<IP address>` is the IP address you want to test.

Security configuration

The network interface is disabled when password protection is removed. For more information about passwords, see "Working with passwords (on page 45)".

Protocol configuration

SL-APM supports SSH and Telnet.

Working with SSH configuration

To enable SSH access, enter `ENABLE SSH`.

To disable SSH access, enter `DISABLE SSH`.

Working with the Telnet configuration

To enable Telnet access, enter `ENABLE TELNET`.

To disable Telnet, enter `DISABLE TELNET`.

Duplicating the configuration

Duplicating a configuration enables you to ensure consistency in configuring SL-APM while saving time in the configuration process.

You can use the output from `SHOW CONFIG` to capture the current configuration of a SL-APM and used as input to configure another SL-APM. The password information is not duplicated because it is not part of the `SHOW CONFIG` output.

To duplicate the SL-APM configuration:

1. Enter `SHOW CONFIG`.
2. To copy the configuration, copy the output of the `SHOW CONFIG` command to a file on your system using whatever methods are available in your terminal program.
3. To replicate the configuration, using the methods that are available in your terminal program, apply the previously saved `SHOW CONFIG` output as input to the new SL-APM.

Command Line Interface

Command line conventions

CLI input is case insensitive except when otherwise noted. The CLI uses a simple, case insensitive verb noun "<target>" syntax.

Each command follows the conventions listed in the following table.

Symbol	Description
`<lower case>`	Denotes the variable within the symbols that must be substituted with a value, such as a user name. Symbols must be removed.
`UPPER CASE`	Denotes input to be entered as shown. Unless noted, symbol is not case-sensitive.
`|`	Used to separate input options.
`{ }`	Denotes a list of mandatory choices that you must make. For example, `SET GATEWAY {NONE | <ip_address>}` must be in the form of either of the following: • `SET GATEWAY NONE` • `SET GATEWAY <ip_address>`
`[ ]`	Denotes an optional argument or set of characters.
`" "`	Encloses command arguments that contain spaces.

Accessing the SL-APM command line interface

You can access the SL-APM through SSH, Telnet, or the serial port.

Accessing the SL-APM through SSH

1. Using any SSH client application, start a SSH session to SL-APM.
2. When prompted, enter the assigned IP address or FQDN of SL-APM.
3. Enter `Administrator`.
4. Enter a valid password. The CLI command prompt appears.
5. Enter commands for SL-APM.
6. To terminate the remote access SSH session, close the communication software or enter `EXIT`, `LOGOUT`, or `QUIT` at the CLI command prompt.

Accessing the SL-APM through Telnet

1. Start a Telnet session to SL-APM using any Telnet client application.

2. When prompted, enter the assigned IP address or FQDN name of SL-APM.
3. Enter `Administrator`.
4. Enter a valid password. The CLI command prompt appears.
5. Enter commands for SL-APM.
6. To terminate the remote access Telnet session, close the communication software or enter `EXIT`, `LOGOUT`, or `QUIT` at the CLI command prompt.

Accessing the SL-APM through the serial port

You can also access the SL-APM through the serial port. For more information, see "Serial Port Configuration (on page 17)."

Saving configurations

You must save your configurations. Otherwise, the configuration will be lost when you reset or reboot the SL-APM.

To save a configuration, enter `SAVE`.

Topology and inventory

SL-APM collects information from connected servers, including:

- SL enclosure product names
- SL enclosure product identifiers (SKU)
- SL enclosure serial numbers
- Node MAC addresses

To show this information using the previous configuration image as an example, use any of the following commands.

Showing the rack

To show the contents of the rack, enter `SHOW RACK`. The rack information appears.

For example, the following text might appear:

```
SL-APM> show rack
1: Dist. Module
   1: SL enclosure
      Product Name :HP ProLiant s6500
      Product SKU  :
      Serial Number:
      UID          :off
      Status       :
                     1 : Compute node (active)
                     2 : Compute node (active)
                     3 : Compute node (active)
                     4 : Compute node (active)
                     5 : Compute node (active)
                     6 : Compute node (active)
```

```
                    7 : Compute node (active)
                    8 : Compute node (active)
                    Power supply slot 1 is occupied, status good
                    Power supply slot 2 is occupied, status good
                    Power supply slot 3 is occupied, status good
                    Power supply slot 4 is empty
                    Fan slot 1 status good
                    Fan slot 2 status good
                    Fan slot 3 status good
                    Fan slot 4 status good
                    Fan slot 5 status good
                    Fan slot 6 status good
                    Fan slot 7 status good
                    Fan slot 8 status good
```

To show a particular rack, enter `SHOW RACK`, followed by either the SL-APM port or both the SL-APM and SL-APM Distribution Module ports.

For example, enter:

```
SHOW RACK 2 4
```

The following example uses the power distribution module:

```
> show rack pdm
9: [PDM1] PDM Extension
    UID          : off
    Model        : Monitored PDU Ext. Bar
    Serial Number: 2CJ9410002
    Part Number  : AF529A
    Firmware Rev : 0.35
    Hardware Rev : HW_PV2
    Switched Outlets:
       1:
        UID    : off
        Enabled: yes
        Wattage: 092
       2:
        UID    : off
        Enabled: yes
        Wattage: 139
       3:
        UID    : off
        Enabled: yes
        Wattage: 011
       4:
        UID    : off
        Enabled: yes
        Wattage: 219
       5:
        UID    : off
        Enabled: yes
        Wattage: 050
10: [PDM2] HP 60A PDU
    Model        : STI Serial TrueRMS PDU
    Serial Number: ADFV0000083
    Asset Tag    : SCI Lab PDU
    Part Number  : QL192A
    Firmware Rev : 1.0a
    Switched Outlets:
```

```
      1: enabled
      2: enabled
      3: enabled
      4: enabled
      5: enabled
      6: enabled
   Input Feeds:
      1:
       Amps Drawn          : 0.840000
       Infeed Status       : On
       Infeed Load Status  : Normal
      2:
       Amps Drawn          : 0.860000
       Infeed Status       : On
       Infeed Load Status  : Normal
      3:
       Amps Drawn          : 0.800000
       Infeed Status       : On
       Infeed Load Status  : Normal
      4:
       Amps Drawn          : 2.530000
       Infeed Status       : N/A
       Infeed Load Status  : Normal
```

This command produces the same results as the `SHOW SERVERS` and `SHOW TOPOLOGY` commands.

To show all the chassis and other devices connected to the SL-APM, enter `SHOW RACK ALL`.

Showing the servers

To show the servers, enter `SHOW SERVERS`. The server information appears.

This command produces the same results as the `SHOW RACK` and `SHOW TOPOLOGY` commands.

Showing topology

To show the topology of everything that connects to the SL-APM, enter `SHOW TOPOLOGY`. The topology appears.

This command produces the same results as the `SHOW RACK` and `SHOW SERVERS` commands.

To show all the chassis and other devices connected to the SL-APM, enter `SHOW TOPOLOGY ALL`.

Showing assetinfo

To list all the chassis in the rack in a report format, enter `SHOW ASSETINFO`.

For example, the following text might appear:

```
slapm> show assetinfo 1 7
1: Dist. Module
    7: SL enclosure
       Product Name :HP ProLiant s6500
       Product SKU  :629235-B21
       Serial Number:USE119A2MM
       UID          :off
       Status       :
                      1 : Compute node (active) Asset tag: myserver1
```

```
Serial #: USE119A2YW
                      2 : Compute node (active) Asset tag: myserver2
Serial #: USE119A2YT
                      3 : Compute node (active) Asset tag: myserver3
Serial #: USE119A319
                      4 : Compute node (active) Asset tag: myserver4
Serial #: USE119A31C
                      5 : Compute node (active) Asset tag: myserver5
Serial #: USE119A2N8
                      6 : Compute node (active) Asset tag: myserver6
Serial #: USE119A2N3
                      7 : Compute node (active) Asset tag: myserver7
Serial #: USE119A2N4
                      8 : Compute node (active) Asset tag: myserver8
Serial #: USE121AJYH
                      Power supply slot 1 is occupied, status good
                      Power supply slot 2 is occupied, status good
                      Power supply slot 3 is occupied, status good
                      Power supply slot 4 is occupied, status good
                      Fan slot 1 status good
                      Fan slot 2 status good
                      Fan slot 3 status good
                      Fan slot 4 status good
                      Fan slot 5 status good
                      Fan slot 6 status good
                      Fan slot 7 status good
                      Fan slot 8 status good
```

This command also requests and shows any asset tags from the chassis and any 30- or 60-amp PDUs that are in the rack.

The asset tag information for 30- or 60-amp PDUs can be set through the `SET ASSETINFO` command.

For example, the following text might appear:

```
> show assetinfo pdm2

10: [PDM2] HP 60A PDU
    Model        : STI Serial TrueRMS PDU
    Serial Number: ADFV0000083
    Asset Tag    : SCI Lab PDU
    Part Number  : QL192A
    Firmware Rev : 1.0a
    Switched Outlets:
       1: enabled
       2: enabled
       3: enabled
       4: enabled
       5: enabled
       6: enabled
    Input Feeds:
       1:
        Amps Drawn          : 0.860000
        Infeed Status       : On
        Infeed Load Status  : Normal
       2:
        Amps Drawn          : 0.870000
        Infeed Status       : On
        Infeed Load Status  : Normal
       3:
```

```
 Amps Drawn          : 0.830000
 Infeed Status       : On
 Infeed Load Status  : Normal
4:
 Amps Drawn          : 2.590000
 Infeed Status       : On
 Infeed Load Status  : Normal
```

Showing the MAC address

To show the MAC address, enter `SHOW MACADDR`. The MAC address appears. The MAC address information appears following each module listing.

For example, the following text might appear on screen.

```
SL-APM> show macaddr

1: Dist. Module
   1: SL enclosure
      Product Name :HP ProLiant s6500
      Product SKU  :
      Serial Number:
      UID          :off
      Status       :
                     1 : Compute node (active) Host MAC: D8:D3:85:AE:E7:03
                     2 : Compute node (active) Host MAC: 78:E7:D1:E4:6E:1F
                     3 : Compute node (active) Host MAC: 78:E7:D1:E4:6E:B9
                     4 : Compute node (active) Host MAC: 78:E7:D1:E4:6E:BD
                     5 : Compute node (active) Host MAC: D4:85:64:6A:52:2D
                     6 : Compute node (active) Host MAC: 1C:C1:DE:18:AC:F7
                     7 : Compute node (active) Host MAC: D4:85:64:6A:51:C3
                     8 : Compute node (active) Host MAC: D4:85:64:6A:52:6D
                     Power supply slot 1 is occupied, status good
                     Power supply slot 2 is occupied, status good
                     Power supply slot 3 is occupied, status good
                     Power supply slot 4 is occupied, status good
                     Fan slot 1 status good
                     Fan slot 2 status good
                     Fan slot 3 status good
                     Fan slot 4 status good
                     Fan slot 5 status good
                     Fan slot 6 status good
                     Fan slot 7 status good
                     Fan slot 8 status good
```

To show a particular MAC address, enter `SHOW MACADDR` and then the SL-APM port or both the SL-APM port and SL-APM Distribution Module port.

For example, enter:

```
SHOW MACADDR 2 4
```

SL-APM logging

Overview of logging

Logging enables you to see the following information in SL-APM

- Actions taken
- Events
- Time when the action was taken or event occurred

SL-APM has the following types of logs:

- Event logs, where SL-APM records events
- Fault logs, where SL-APM records errors, such as a power supply not working

  SL-APM has the following types of fault log entries:

  - Normal errors, such as an invalid password
  - Alerts, in which the red LED illuminates. For a list of alert messages, see "Alert messages (on page 58)"

You can issue commands for both internal and external logging.

Use an external syslog server for:

- Redundant copy of events and logs
- Not limiting the events list to only the last 100 events

To ensure the correct time stamping in your logs, use the `SET TIME` command. For more information, see "Setting the time (on page 51)".

Internal logging

Internal logging tracks up to 500 entries on the event log, up to 100 entries on the fault log, and overrides the oldest log entries if those sizes are exceeded.

Showing and clearing the event log

To show the event log, enter `SHOW LOG`..

As an example, the following text might appear on screen:

```
SL-APM> show log
NOTE: Log truncated, only latest 100 entries included in list
000:WED JAN 13 10:59:35 2010:   Dist. Module 2, port 10, issued command to power
off all servers
001:WED JAN 13 10:59:53 2010:   Fan found in chassis at Dist. Module #2, port
9, slot 1
002:WED JAN 13 10:59:54 2010:   Fan found in chassis at Dist. Module #2, port
10, slot 1
```

```
003:WED JAN 13 11:03:20 2010:    Dist. Module 1, port 5, server 1 was powered off
004:WED JAN 13 11:03:29 2010:    Dist. Module 1, port 5, server 2 was powered off
005:WED JAN 13 11:03:33 2010:    Dist. Module 1, port 5, server 3 was powered off
006:WED JAN 13 11:04:19 2010:    Dist. Module 1, port 5 - all units in enclosure
were powered on
007:WED JAN 13 11:04:36 2010:    A server was powered on in chassis Dist. Module
#1, port 5, slot 4
008:WED JAN 13 11:04:40 2010:    Dist. Module 1, port 5 - all units in enclosure
were powered off
009:WED JAN 13 11:05:18 2010:    Dist. Module 1, port 1 - all units in enclosure
were powered off
010:WED JAN 13 11:05:38 2010:    Dist. Module 1, port 1 - all units in enclosure
were powered on

...
```

To clear the event log, enter `CLEAR LOG`.

Showing and clearing the fault log

To show the fault log, enter `SHOW FAULTS`.

As an example, the following text might appear on screen:

```
SL-APM> show faults
000:TUE DEC 15 07:45:22 2009:    No response from SL enclosure on Power Manager
port 2, Dist. Module port 6
001:WED JAN 13 10:58:15 2010:    No response from Dist. Module #2 for power on
command
002:WED JAN 13 10:59:29 2010:    No response from Dist. Module #2 for power off
command
003:WED JAN 13 11:08:42 2010:    No response from SL enclosure on Power Manager
port 3, Dist. Module port 6
004:WED JAN 13 11:09:37 2010:    No response from Dist. Module to set SL enclosure
3 on port 7
005:WED JAN 13 11:09:42 2010:    No response from Dist. Module to set SL enclosure
3 on port 8
006:WED JAN 13 11:09:47 2010:    No response from Dist. Module to set SL enclosure
3 on port 9
007:WED JAN 13 11:09:52 2010:    No response from Dist. Module to set SL enclosure
3 on port 10
008:WED JAN 13 11:10:14 2010:    No response from SL enclosure on Power Manager
port 2, Dist. Module port 6
009:WED JAN 13 11:11:41 2010:    No response from Dist. Module 2 to close all ports
010:WED JAN 13 11:11:46 2010:    No response from Dist. Module to set SL enclosure
2 on port 3
011:WED JAN 13 11:11:51 2010:    No response from Dist. Module to set SL enclosure
2 on port 4
012:WED JAN 13 11:11:56 2010:    No response from Dist. Module to set SL enclosure
2 on port 7
013:WED JAN 13 11:12:01 2010:    No response from Dist. Module to set SL enclosure
2 on port 8
014:WED JAN 13 11:12:06 2010:    No response from Dist. Module to set SL enclosure
2 on port 9
015:WED JAN 13 11:12:11 2010:    No response from Dist. Module to set SL enclosure
2 on port 10
```

To clear the fault log, enter `CLEAR FAULTS`.

External logging

To show the syslog server address configuration information, enter `SHOW SYSLOG`.

To set the syslog server address configuration, enter `SET SYSLOG x.x.x.x`.

Using an existing syslog server provides:

- Redundant copy of events and logs
- No limits to number of events that can be logged

SL-APM fault messages

Fault logged message	**Description**
There was an error transferring the file, image upgrade not performed	Error occurred during firmware upgrade.
Error upgrading firmware image	Firmware image not upgraded due to an error.
Dist. Module on Power Manager port X has excessive errors and has been marked as failed	RS-485 port is having excessive errors and has failed.
Dist. Module port X on Power Manager port Y has excessive errors and has been marked as failed	RS-485 port is having excessive errors and has failed.
Transmit failed to write	Hardware error transmitting a packet.
Read error on UART	Hardware error receiving a packet.
Power Manager rendered non functional, redundant Power Manager is not supported by this firmware version	A redundant SL-APM board was plugged into the chassis. Both boards will be rendered inoperable until one is removed.
Please remove one of the Power Manager boards from the chassis and reset	A redundant SL-APM board was plugged into the chassis. Both boards will be rendered inoperable until one is removed.
Power Manager Power supply 1 is non operational	Power supply in slot 1 is not supplying power to the SL-APM chassis.
Power Manager Power supply 2 is non operational	Power supply in slot 2 is not supplying power to the SL-APM chassis.
Checksum failure - administrator account	Checksum failure while reading account credentials.

Fault logged message	Description
credentials	
Checksum failure - password credentials	Checksum failure while reading account credentials.
Could not enable credentials at startup, code = X	Credentials could not be verified and are disabled. If configured, the network connection is also disabled.
WARNING: Password bypass DIP #1 is set, password security is bypassed	Security bypass is enabled. No passwords are required to access the SL-APM.
Firmware update to Dist. Module, port X failed, retry Y being attempted	While upgrading the firmware on a Power Manager Distribution Module, an error occurred. Retry being attempted.
Firmware update to Dist. Module, port X - all retries, failed, giving up	While upgrading the firmware on a Power Manager Distribution Module, too many errors occurred and the operation has been terminated.

Power capping

Power capping overview

The HP ProLiant SL family of products provides a power capping feature that operates at the server enclosure level. The capping feature can be activated using a stand-alone utility called PPIC.EXE that runs in the environment of one of the resident servers in the chassis to be power capped. After a power cap is set for the enclosure, all the resident servers in the enclosure will have the same uniform power cap applied to them until the cap is either modified or canceled.

With SL-APM, the enclosure-level power capping feature can be expanded without the need to use the PPIC.EXE utility. A global power cap can be applied to all enclosures with one SL-APM command, or different caps can be applied to user-defined groups by using flexible zones within the same rack.

NOTE: HP recommends configuring the SL-APM so that it controls only one rack.

Power capping requirements

The following SL server products support power capping:

- HP ProLiant SL160s G6 Server (with BIOS of O33-05192011 or later)
- HP ProLiant SL165s G7 Server (with BIOS of O37-08102011 or later)
- HP ProLiant SL170s G6 Server (with BIOS of O40-05112011 or later)
- HP ProLiant SL230s Gen8 Server
- HP ProLiant SL250s Gen8 Server
- HP ProLiant SL335s G7 Server (with BIOS of A24-later than 02042011)
- HP ProLiant SE2170s and SE1170s Servers (if in ProLiant s6500 chassis and have BIOS of O40-05112011 or later)
- HP ProLiant SL390s G7 Server (with BIOS of P69-050511 or later)

Power capping has the following minimum firmware requirements:

- SL-APM 1.30 or later
- SL Power Management Controller (SL Chassis) enclosure firmware 4.3 or later

To support the SL-APM Power Capping functionality, all tray nodes in the chassis must be rebooted after the Power Management Controller firmware has been updated to version 4.3 and the appropriate BIOS version has been flashed. A reboot is also required anytime you add an advanced license to the node. Upgrading to future versions of Power Management Controller firmware or SL-APM firmware does not require a reboot of the node to support the power capping feature.

SL-APM management requirements

Minimum firmware requirements are:

- SL-APM 1.40
- SL Power Management Controller (SL Chassis) enclosure firmware 4.5 or later

To support the SL-APM Power Capping functionality, all tray nodes in the chassis must be rebooted after the Power Management Controller firmware has been updated to version 4.5 and the appropriate BIOS version has been flashed. A reboot is also required anytime you add an advanced license is added to the node. Upgrading to future versions of Power Management Controller firmware or SL-APM firmware does not require a reboot of the node to support the power capping feature.

Power capping and measurement tolerance

The average chassis power level displayed by SL-APM will not exceed 5% above the chassis power cap.

NOTE: The power baseline process is required for power capping functionality to work properly. All servers must be powered on and running an expected typical workload before starting the power baseline process. Because the baseline process will cap the servers briefly, performance will be impacted while power is measured and the baseline established.

As with any measurement system, variations in temperature, input power, and system loads will impact the accuracy of the power calculations. All power reading displayed by this utility will have a -/+ 5% tolerance. However, meter errors can be both positive and negative, so guardband for meter tolerance, as a percentage of the cap, can approach zero as the number of servers increases.

Invalidating a power baseline

Since power baselines are global, the SL-APM monitors the domains for changes in server and power supply presence when a power baseline has been established. If a change occurs (for example, a new server is inserted), then the SL-APM detects this change and invalidates the current power baseline. This invalidation prevents any new caps from being set, but does not disable any existing caps that are set.

If a baseline has been invalidated due to changing hardware in the SL-APM domain, then several options are available.

- If the change was caused by replacement of equipment (for example, a failed power supply was removed and a new one inserted) then the old baseline can be restore by simply resetting the SL-APM and forcing it to re-read and re-compare the existing power baseline from the resident EEPROM.
- If any of the following changes occur, the domain configuration changes, and then you must establish a new power baseline using the SET POWER BASELINE command.
  - SL Power Management Controller (SL Chassis) Firmware has been updated.
  - Add or remove the power supply.
  - Add or remove a new server or enclosure.
  - Add or remove memory from the tray.
  - Add or remove CPU from the tray.
  - Add or remove GPU from the tray.

Power capping licensing

All servers that are being power capped must have the iLO\LO100 advanced license installed. Before a power baseline can be established, the SL-APM verifies that all the servers housed in an SL enclosure have the advanced license pack installed. If any resident servers in the enclosure do not have the iLO\LO100 advanced license, the power baseline process ("Power baseline" on page 31), a prerequisite for power capping for the enclosure, is skipped.

The SL-APM has no licensing considerations.

SL-APM and SL-APM Distribution Module cabling

All supported SL enclosures and servers that are wired to the SL-APM through one or more SL-APM Distribution Modules can participate in power capping and monitoring. Separate power cap settings can be made for as many or as few of the enclosures as desired, but the power baseline process must operate as a global process that interacts with every supported enclosure that the SL-APM is connected to through the SL-APM distribution modules.

Rack level power capping

The rack level power cap is a power cap set at the SL-APM level and, despite the name, can encompass a partial rack, a rack, or multiple racks. These domains are established by the reach of the SL-APM and distribution module connections to the support SL enclosures combined with any optional zone definitions that may have been created. The term rack level power cap is used generically in this document to refer to any power cap that has been set at the SL-APM level.

The power capping feature has two main processes to it. The first process establishes a power baseline. The second process sets a power cap against the previously established power baseline.

Power baseline

The power baseline is a calibration that indicates the range of how little power the chassis can consume at their maximum allowable power cap and how much power they can consume when completely uncapped. The minimum value is derived by capping the servers at their maximum internally allowable cap setting, running the enclosure fans up to 90% of capacity, and then measuring the power consumption of the chassis at the power supply level.

SL enclosures cannot be power calibrated by the SL-APM if:

- All the servers that populate the chassis do not carry the iLO/LO100 advanced license (empty slots are OK).
- The chassis is using incompatible SL Power Management (SL Chassis) enclosure firmware prior to version 4.3.
- The server or enclosure hardware does not support the power capping feature.

If these checks are met (SL-APM verifies these conditions for each chassis), then the power baseline process will proceed for that chassis. The baseline calibration process is run against every enclosure connected to the SL-APM with the exceptions listed previously. Some enclosures might be baselined while others are not due to the previously listed reasons. After a power baseline is established for all enclosures, then the baseline is

committed to the SL-APM onboard EEPROM so that it becomes persistent when SL-APM is reset during operation.

> **NOTE:** The power baseline process is required for power capping functionality to work properly. All servers must be powered on and running an expected typical workload before starting the power baseline process. Because the baseline process will cap the servers briefly, performance will be impacted while power is measured and the baseline established.

After established and saved in the EEPROM, the baseline data can be examined at any time using the `SHOW POWER BASELINE` command. For example:

```
> show power baseline

APMPort DMPort Serial Number Min Cap Max Cap Set Cap Slots    Populated
------- ------ ------------- ------- ------- ------- ----- ---------------

      1      2 CNK71600K4        585    2372    1500  (8)  2 3 5 7
                               ------- ------- -------
                                  585    2372    1500
```

If a SL-APM has baseline data in its EEPROM and it is reset, SL-APM will re-read that baseline data back into memory as it boots back up and after the subsequent device discovery compares the baseline data in the EEPROM to the actual rack contents to ensure that they did not change while it was offline or that it was not relocated to another rack. The SL-APM validates the following things from saved baseline data in these instances:

- The chassis listed in the baseline is present
- The chassis has the same populated server slots
- If a power cap had been set, that this is the power cap currently set on the chassis

If any of these do not match up after a reset, the SL-APM will log an error to its log indicating the mismatch in the baseline data and the baseline data will be invalidated. It will not, however, be erased from its EEPROM to provide you the chance to re-insert any chassis or servers that invalidated the baseline data.

To remove baseline data from the EEPROM, use the `SET POWER BASELINE NONE` command. After this command is used, the only way to re-establish a power baseline is to use the `SET POWER BASELINE` command.

If a power cap is currently in place, the `SET POWER BASELINE NONE` command cannot be used. The power cap must first be removed (`SET POWER CAP NONE`) then the baseline can be removed.

If a power cap is currently in place and a `SET POWER BASELINE` command is issued, then any current power caps will be removed in the calibration. New power caps can be established following the calibration process, assuming the new baseline data is saved to the EEPROM.

The following text is an example output when an advanced license is installed on all chassis.

```
> set power baseline

Before running a baseline calibration - ensure that
your configuration has all machines turned on and are
running processes that are typical of the type of workload
you expect them to run in a production environment.

This process will briefly impact the performance of the
servers that are being baseline calibrated as well as
temporarily speed up the fans.
```

```
Are you sure you wish to set a new power baseline for this system? (Y/N/Q) ->
Yes

Retrieving license information for chassis Power Manager port 1, Dist. Module
port 1

Verifying..done

Baselining power for servers located in chassis Power Manager port 1, Dist. Module
port 1

Calibrating.................done.

Minimum cap value for this chassis is 777

Maximum cap value for this chassis is 3558
```

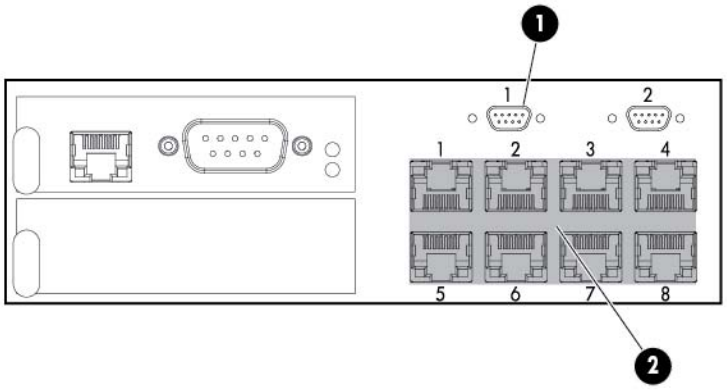
The following text is an example output when an advanced license was not installed on four chassis (1 1, 1 6, 1 7, and 1 10).

```
> set power baseline

Before running a baseline calibration - ensure that
your configuration has all machines turned on and are
running processes that are typical of the type of workload
you expect them to run in a production environment.

This process will briefly impact the performance of the
servers that are being baseline calibrated as well as
temporarily speed up the fans.

Are you sure you wish to set a new power baseline for this system? (Y/N/Q) ->
Yes

Retrieving license information for chassis Power Manager port 1, Dist. Module
port 1

Verifying..done

One or more servers located in chassis at Power Manager port 1, Dist. Module port
1 is not licensed for the power capping feature.

This chassis will be skipped for baselining purposes.

Note:   All licensed servers should be booted up at least once
        so the BIOS/ROM can write the relevant license information
        to the chassis controller.

Retrieving license information for chassis Power Manager port 1, Dist. Module
port 2

Verifying..done
```

Setting power capping

Use the `SET POWER CAP` command to specify a power cap. The command takes an AC wattage range that must be between the minimum and maximum values that were set with the `SET POWER BASELINE` command and are shown with the `SHOW POWER BASELINE` command.

In this example, APM Port (item 1) and DM Port (item 2) are illustrated.




```
> show power baseline
APMPort DMPort Serial Number Min Cap Max Cap Set Cap Slots    Populated
------- ------ ------------- ------- ------- ------- ----- ----------------
      1      2 CNK71600K4        585    2372    1500  (8)  2 3 5 7
                               ------- ------- -------
                                   585    2372    1500
```

A power cap can be set between the minimum cap value of 585 and the maximum cap value of 2372. In this example, the cap applies only to the chassis located at APM Port 1, DM Port 2 because that is the only chassis that met the necessary prerequisites for power capping. Under circumstances with many chassis, the allowable cap range would fall between the total minimum and total maximum values.

Under normal circumstances, the average chassis power level might be up to 5% above the chassis power cap. However, the cap value might vary under extreme power usage situations.

When running the baseline calibration, the target system (all nodes in chassis) has to be running at the production level load.

The following is an example with mixed Power Management Controller (SL Chassis) Firmware version 4.3 and lower:

```
> show power
MDM     Port     Node      Avg      Min      Max
----     ----     ----     -----    -----    -----
   1        1        1
   78     n/a      206    (DC watts)
   1        1        2       80     n/a      203    (DC watts)
   1        1        3       77     n/a      208    (DC watts)
   1        1        4       77     n/a      206    (DC watts)
   1        1        5       81     n/a      207    (DC watts)
   1        1        6       76     n/a      210    (DC watts)
   1        1        7       82     n/a      225    (DC watts)
   1        1        8       81     n/a      225    (DC watts)
   1        2     (no SL enclosure present)
   1        3        1      255     n/a      337    (DC watts)
   1        3        2      257     n/a      340    (DC watts)
   1        3        3      242     n/a      324    (DC watts)
   1        3        4      232     n/a      315    (DC watts)
   1        3        5      265     n/a      351    (DC watts)
```

```
   1       3       6      259    n/a      344   (DC watts)
   1       3       7      240    n/a      325   (DC watts)
   1       3       8      258    n/a      346   (DC watts)
   1       3    Fans       20                   (DC watts)
   1       3                                   2036 (Chassis total - DC watts)
   1       3                                   2151 (Chassis total - AC watts)
   1       3                                   2247 (Chassis cap   - AC
watts)
   1       4       1       91    n/a      188   (DC watts)
   1       4       2    (empty)
   1       4       3      115    n/a      186   (DC watts)
   1       4       4    (empty)
   1       4       5    (empty)
   1       4       6    (empty)
   1       4       7    (empty)
   1       4       8    (empty)
   1       4    Fans       14                   (DC watts)
   1       4                                    221 (Chassis total - DC watts)
   1       4                                    266 (Chassis total - AC watts)
   1       4                                    852 (Chassis cap   - AC
watts)
   1       5    (no SL enclosure present)
   1       6    (no SL enclosure present)
   1       7    (no SL enclosure present)
   1       8    (no SL enclosure present)
   1       9    (no SL enclosure present)
   1      10    (no SL enclosure present)
   2       1    (no SL enclosure present)
   2       2    (no SL enclosure present)
   2       3    (no SL enclosure present)
   2       4    (no SL enclosure present)
   2       5    (no SL enclosure present)
   2       6    (no SL enclosure present)
   2       7    (no SL enclosure present)
   2       8    (no SL enclosure present)
   2       9    (no SL enclosure present)
   2      10    (no SL enclosure present)
   3    (no Dist. Module present)
   4    (no Dist. Module present)
   5    (no Dist. Module present)
   6    (no Dist. Module present)
   7    (no Dist. Module present)
   8    (no Dist. Module present)

Total servers = 18
Total chassis = 3

PDM    Port    Load
----    ----    ----
   1       1      86 (AC watts)
   1       2     151 (AC watts)
   1       3       0 (AC watts)
   1       4     470 (AC watts)
   1       5      11 (AC watts)
   2    (no PDM Extension present)
                ----
                 718
```

The following example uses the power distribution module.

```
> show power pdm
```

```
PDM port 1
         PDM    Port    Load
        ----    ----    ----
           1       1      93 (AC watts)
           1       2     140 (AC watts)
           1       3      11 (AC watts)
           1       4     228 (AC watts)
           1       5      50 (AC watts)
                         ----
                          522
PDM port 2
        PDU:                STI Serial TrueRMS PDU
        Part Number:        QL192A
        Serial Number:      ADFV0000083
        Asset tag:          SCI Lab PDU
        Firmware rev:       1.0a
        Infeed Amps:        60
        Number of Infeeds: 4
        Switched Outlets:  6
        Infeeds:
                01: Amps drawn: 0.850000 Status: On Load: Normal
                02: Amps drawn: 0.880000 Status: On Load: Normal
                03: Amps drawn: 0.820000 Status: On Load: Normal
                04: Amps drawn: 2.560000 Status: N/A Load: Normal
        Switched ports:
                01: Enabled
                02: Enabled
                03: Enabled
                04: Enabled
                05: Enabled
                06: Enabled
```

This example is with the Power Management Controller (SL Chassis) Firmware version 4.3 only.

```
> show power 1 3

MDM    Port    Node      Avg     Min     Max
----    ----    ----    -----   -----   -----
   1       3       1      254    n/a      337   (DC watts)
   1       3       2      255    n/a      340   (DC watts)
   1       3       3      244    n/a      324   (DC watts)
   1       3       4      233    n/a      315   (DC watts)
   1       3       5      265    n/a      351   (DC watts)
   1       3       6      258    n/a      344   (DC watts)
   1       3       7      238    n/a      325   (DC watts)
   1       3       8      259    n/a      346   (DC watts)
   1       3    Fans       20                  (DC watts)
   1       3                                  2033 (Chassis total - DC watts)
   1       3                                  2148 (Chassis total - AC watts)
   1       3                                  2247 (Chassis cap   - AC
watts)

Total servers = 8
Total chassis = 1
Total fan wattage    =   20 (DC watts)
Total system wattage = 2033 (DC watts)
Total system wattage = 2148 (AC watts)

> show power baseline
```

```
All values listed are in AC watts
APMPort DMPort Serial Number Min Cap Max Cap Set Cap Slots    Populated
------- ------ ------------- ------- ------- ------- -----  ----------------
      1      3 0000000000       2242    4744       0  (8)  1 2 3 4 5 6 7 8
      1      4                   845    4744       0  (8)  1 3
                               ------- ------- -------
                                  3087    9488       0

> show power

MDM    Port    Node      Avg     Min     Max
----    ----    ----    -----   -----   -----
   1       1    (no SL enclosure present)
   1       2    (no SL enclosure present)
   1       3       1      255    n/a      337   (DC watts)
   1       3       2      256    n/a      340   (DC watts)
   1       3       3      245    n/a      324   (DC watts)
   1       3       4      235    n/a      315   (DC watts)
   1       3       5      267    n/a      351   (DC watts)
   1       3       6      263    n/a      344   (DC watts)
   1       3       7      237    n/a      325   (DC watts)
   1       3       8      256    n/a      346   (DC watts)
   1       3    Fans       21                  (DC watts)
   1       3                                  2042 (Chassis total - DC watts)
   1       3                                  2157 (Chassis total - AC watts)
   1       3                                  2247 (Chassis cap   - AC
watts)
   1       4       1       92    n/a      188   (DC watts)
   1       4       2    (empty)
   1       4       3      115    n/a      186   (DC watts)
   1       4       4    (empty)
   1       4       5    (empty)
   1       4       6    (empty)
   1       4       7    (empty)
   1       4       8    (empty)
   1       4    Fans       14                  (DC watts)
   1       4                                   223 (Chassis total - DC watts)
   1       4                                   268 (Chassis total - AC watts)
   1       4                                   852 (Chassis cap   - AC
watts)
   1       5    (no SL enclosure present)
   1       6    (no SL enclosure present)
   1       7    (no SL enclosure present)
   1       8    (no SL enclosure present)
   1       9    (no SL enclosure present)
   1      10    (no SL enclosure present)
   2       1    (no SL enclosure present)
   2       2    (no SL enclosure present)
   2       3    (no SL enclosure present)
   2       4    (no SL enclosure present)
   2       5    (no SL enclosure present)
   2       6    (no SL enclosure present)
   2       7    (no SL enclosure present)
   2       8    (no SL enclosure present)
   2       9    (no SL enclosure present)
   2      10    (no SL enclosure present)
   3    (no Dist. Module present)
   4    (no Dist. Module present)
   5    (no Dist. Module present)
   6    (no Dist. Module present)
```

```
   7     (no Dist. Module present)
   8     (no Dist. Module present)

Total servers = 10
Total chassis = 2
Total fan wattage     =    35 (DC watts)
Total system wattage = 2265 (DC watts)
Total system wattage = 2425 (AC watts)

PDM     Port     Load
----     ----     ----
   1        1       87 (AC watts)
   1        2      150 (AC watts)
   1        3        0 (AC watts)
   1        4      464 (AC watts)
   1        5       11 (AC watts)
   2     (no PDM Extension present)
                  ----
                   712
```

In the following example, the cap is set to 1500 AC watts. This information is saved as part of the baseline data to the onboard SL-APM EEPROM.

When multiple chassis are present and a valid rack level cap is given, SL-APM will:

1. Compute the total cap as a percentage against the sum of the eligible chassis' max power values.
2. For each chassis, multiply the percentage computed in step 1 against each chassis individual max power value.
3. Program the result into the chassis.
4. Repeat steps 2-3 for each eligible chassis.

To remove a power cap, use `SET POWER CAP NONE`. This action removes all power cap settings from all the servers.

Creating SL-APM power mappings

Zones are collections of SL-APM enclosures that can be given a unique name that can be referred to for power capping purposes.

Zones provide the SL-APM user with the capability of distinguishing groups of enclosures as targets for power or management operations. When zones are defined they are strictly a boundary definition that is kept within the SL-APM for its purposes. Zones can be added or removed with the `ADD ZONE` and `REMOVE ZONE` commands.

When the first ADD references a zone name that does not exist, the zone is automatically created and the indicated ports are populated into the newly created zone. Subsequent `ADD ZONE` commands that reference the same zone name causes the specified ports to be added to the existing zone. No limit exists for the number of ports other than the maximum SL-APM supports in hardware that can be added to a zone. Multiple port listings can be used with a single `ADD ZONE` command, or multiple `ADD ZONE` commands can be used with each command adding new ports to the zone previously defined by the first `ADD ZONE` command.

To remove zone references to ports, use the `REMOVE ZONE` command. When the last port is removed from a zone, the zone is automatically deleted. A zone cannot exist where no ports are assigned to it and zone port definitions cannot overlap (that is, the same SL chassis cannot exist in more than one zone).

Defining zones is an optional function, and is useful for applying power caps to some chassis while excluding others or applying different power caps to different groups or single SL chassis.

Since SL-APM zones are merely definitions of user defined SL-APM group boundaries (and by extension any chassis that are plugged into those ports), they ignore the actual physical presence of enclosures as they are being defined in the SL-APM CLI. Empty SL-APM ports can be included in a zone. If an enclosure is plugged into that port sometime later, it automatically is part of that zone. A reminder message will be printed if a zone is mapped to a SL-APM port that currently has no SL enclosure plugged into it.

After zone mappings have been completed with the `ADD ZONE` and `REMOVE ZONE` commands, the `SHOW ZONES` command can be used, for example:

```
> show zones

Zone RED:
        Power Manager port 1:
                Dist. Module port 1
Zone BLUE:
        Power Manager port 1:
                Dist. Module port 2
                Dist. Module port 3
Zone GREEN:
        Power Manager port 2:
                all Dist. Module ports included
Zone YELLOW:
        Power Manager port 3:
                Dist. Module port 1
>
```

After a zone mapping has been completed, they can be saved to the SL-APM onboard EEPROM with the `SAVE ZONES` command. This action makes the zone definitions persistent across SL-APM resets. It will be automatically reloaded on reboot. If `SAVE ZONES` is not used, the zone data will be lost if the SL-APM is reset.

If a zone needs to be deleted, the `REMOVE ZONE <zone name> ALL` command can be used. This causes all ports to be removed from the zone definition and then delete the zone itself. As with all zone mapping modifications, to make it persistent across SL-APM resets, enter `SAVE ZONES`.

Power capping with zones

If zones are defined as described above (and assuming a power baseline has been established for the rack), then the `SET POWER CAP` command can accept a zone name as a parameter after the wattage value (or `NONE` if a power cap is being removed).

For example:

```
> show zones

Zone BLUE:
        Power Manager port 1:
                Dist. Module port 2
                Dist. Module port 3
Zone GREEN:
        Power Manager port 2:
                all Dist. Module ports included
Zone YELLOW:
        Power Manager port 3:
                Dist. Module port 1

> show power baseline

APMPort DMPort Serial Number Min Cap Max Cap Set Cap Slots    Populated
------- ------ ------------- ------- ------- ------- ----- ----------------
      1      1                     0       0       0  (8)
```

```
      1      2 CNK71600K4         585    2372    1500   (8)   2 3 5 7
                                -------  -------  -------
                                   585    2372    1500
```

```
> set power cap 2000 blue

New cap represents 84 percent of the max cap of eligible entities.
Apply cap (Y/N) ->
```

The above output sets a power cap only to those chassis that are in the zone defined as BLUE. If all the caps must be removed from a zone, then SET POWER CAP NONE can be used.

```
> set power cap none blue

Remove power cap(s)? (Y/N) ->
```

The above command removes all power cap settings from the SL-APM chassis that is resident in on the SL-APM port 1 and distribution module ports 2 and 3, or zone blue. Since there is only a single chassis that matches that description, the operation only affects that one chassis.

If a cap is set using a zone, then the zone is removed, the cap is unaffected. A new zone may be created that includes some or all of the ports of the former zone and caps set against the new zone as well. Zones are strictly a defined set of SL enclosures that can be used to specify which machines are being considered for a cap. They are a vehicle for enabling multiple caps and/or “exclusion” areas to be created within a single SL-APM domain of enclosures with respect to power capping.

Power baselines and zones

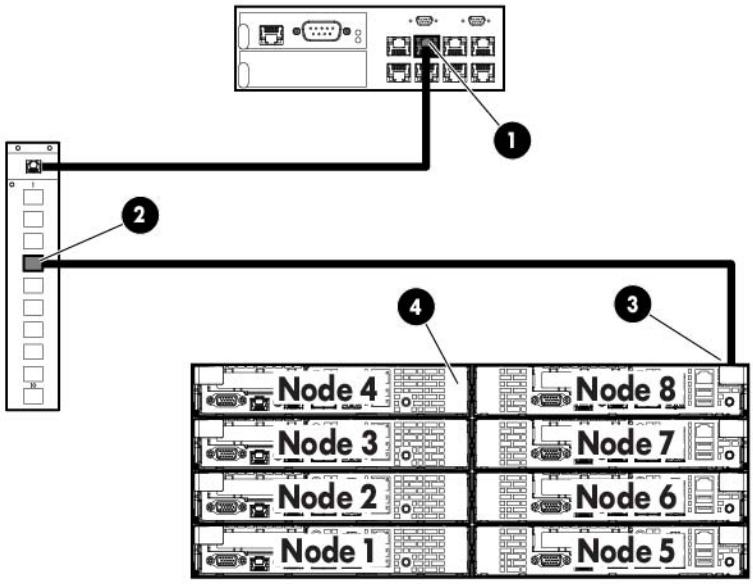
The power baseline cannot be created with respect to a zone. The baseline is a singular separate entity that is saved into the SL-APM EEPROM. Zones can use portions of the established baseline when considering power caps, but the baseline is established globally.

Power commands

NOTE: For the power capping feature, you must have SL-APM 1.30 or later. You must also have an HP ProLiant s6500 Chassis or later with BIOS support required. SL-APM 1.30 does not support the HP ProLiant DL1000, DL2000, or SL6000 Chassis.

The power commands use the SL-APM port number, the distribution module port number, and server node port number as input parameters.

In the following figure, the SL-APM port 2 is connected to the SL-APM Distribution Module port 4. The distribution module port, in turn, is connected to the SL enclosure and server node 8.



Item	Description
1	SL-APM
2	SL-APM Distribution Module
3	SL series enclosure
4	Bay 4 of a 4U chassis SL6500 Scalable System enclosure with eight 1U half-width nodes

Displaying the rack power status

Enter `SHOW POWER`, and then optionally the specific SL-APM port, or both the SL-APM and the SL-APM Distribution Module ports.

For example:

`SHOW POWER` (to show all power)

`SHOW POWER 2` (to show the power for the SL-APM port number)

`SHOW POWER 2 4` (to show the power for the SL-APM port number and the SL-APM Distribution Module port number

This command also displays:

- Fan power per chassis in DC watts
- Chassis total in DC watts
- Chassis total in AC watts
- Chassis cap in AC watts (if one is set)
- The total of the averages is shown as well as the "average of averages" that was already there
- The average max power is shown as well as the total of the max column

- A total count of all the servers and chassis listed
- Total fan wattage for the listing
- Total system wattage in DC watts
- Total system wattage in AC watts

For example, the following text might appear on screen:

```
MDM     Port     Node       Avg      Min      Max
----     ----     ----     -----    -----    -----
   1        1        1       67     n/a       165   (DC watts)
   1        1        2    (empty)
   1        1        3       64     n/a       242   (DC watts)
   1        1        4    (empty)
   1        1        5    (empty)
   1        1        6    (empty)
   1        1        7        0     n/a        72   (DC watts)
   1        1        8       37     n/a        86   (DC watts)
   1        1     Fans       35                     (DC watts)
   1        1                                        203 (Chassis total - DC watts)
   1        1                                        236 (Chassis total - AC watts)
   1        2        1    (empty)
   1        2        2       94     n/a        94   (DC watts)
   1        2        3       64     n/a       179   (DC watts)
   1        2        4    (empty)
   1        2        5       74     n/a       169   (DC watts)
   1        2        6    (empty)
   1        2        7        0     n/a         0   (DC watts)
   1        2        8    (empty)
   1        2     Fans      235                     (DC watts)
   1        2                                        467 (Chassis total - DC watts)
   1        2                                        507 (Chassis total - AC watts)
   1        2                                       1500 (Chassis cap   - AC
watts)
   1        3     (no SL enclosure present)
   1        4     (no SL enclosure present)
   1        5     (no SL enclosure present)
   1        6     (no SL enclosure present)
   1        7     (no SL enclosure present)
   1        8     (no SL enclosure present)
   1        9     (no SL enclosure present)
   1       10     (no SL enclosure present)
   2     (no Dist. Module present)
   3     (no Dist. Module present)
   4     (no Dist. Module present)
   5     (no Dist. Module present)
   6     (no Dist. Module present)
   7     (no Dist. Module present)
   8     (no Dist. Module present)
                           -----    -----    -----
                             400        0     1007 (Totals)
                              50        0      125 (Averages)


Total servers = 8
Total chassis = 2
Total fan wattage    =  270 (DC watts)
Total system wattage =  670 (DC watts)
Total system wattage =  743 (AC watts)
```

```
 PDM     Port     Load
----     ----     ----
   1     (no PDM Extension present)
   2     (no PDM Extension present)
                  ----
                     0
```

Setting power

Power management enables you to turn on and off single or multiple nodes within the rack.

To turn an SL server node on or off, use the `SET POWER` command. Enter the following:

```
SET POWER {ON|OFF|ENABLE|DISABLE} {ALL | <PORT#> <DMPORT#> {<NODE#>|ALL}}
```

where:

`ALL` is used when the command applies to all nodes. You can also use `ALL` when the command applies to all the server nodes in a particular SL server enclosure.

`<PORT#>` refers to the SL-APM, PDM1, or PDM2 port numbers.

`<DMPORT#>` refers to the SL-APM Distribution Module port number or the HP Intelligent Modular PDU Extension Bar outlet number.

`<NODE#>` refers to the SL server node.

For example, to power on SL server node 3, enter:

```
SET POWER ON 2 4 3
```

To power off SL server node 3, enter:

```
SET POWER DISABLE 2 4 3
```

When you set power on for a particular SL server enclosure, you must include either the node number or `ALL` in the command.

To set power on for the SL server nodes in the enclosure, enter:

```
SET POWER ON 2 4 ALL
```

To power on all nodes connecting to the chassis on all SL-APM Distribution Module ports, enter:

```
SET POWER ON ALL
```

NOTE: SNMP traps denoted by an asterisk (*) are not supported on the HP ProLiant s6500 Chassis.

To power on the PDU ports, enter:

```
SET POWER ON PDM
```

To power off PDU ports, enter:

```
SET POWER OFF PDM
```

Polling servers for power values

To enable a background process that polls each server for its average, minimum, and maximum power values, enter `ENABLE POLLPOWER`.

Polling these values increases the performance of SNMP queries of these power values.

The poll cycle time varies depending on how many server chassis are plugged into the SL-APM system. The more chassis that are present, the less frequently each server will be polled.

If POLLPOWER is enabled, then an SNMP request for any of these values on any resident server returns the last polled value instead of requesting the real time values from the server at the time the request is made.

Disabling the polling of servers for power values

To disable the background process that is polling each server for power usage, enter `DISABLE POLLPOWER`. The `DISABLE POLLPOWER` setting is the default.

General commands

Working with passwords

SL-APM has no factory-assigned password. You can set a password and enable or disable a password (if you have set a password). SL-APM has an override switch if you forget your password. For more information, see "Using the security override (on page 49)".

SL-APM has only one login account. This account is the “Administrator” account. If a password is assigned to the administrator account, the password is stored on the SL-APM controller. If you move the controller to another SL-APM enclosure, the password moves with the controller.

Configuring Ethernet requires a password.

Setting SL-APM passwords

To set the password, enter `SET PASSWORD`.

You are prompted for a password when you access SSH, Telnet, or serial port access to the SL-APM. You can have only one password for SL-APM.

The password must be between 8 and 40 characters, and can include:

- Uppercase letters
- Lowercase letters
- Underscores (_)
- Dashes (-)
- At signs (@)
- Pound signs (#)
- Carets (^)
- Ampersands (&)
- Exclamation points (!)
- Plus symbols (+)
- Equal symbols (=)
- Tilde (~)
- Numerical values between 0–9

To save and enable the password, press **Enter.**

Alternatively, you can set the password by entering `SET PASSWORD <”password”>`. For example, enter the following:

```
SET PASSWORD "alphabravo"
```

When entering a password in this manner, you must include quotation marks around the password being set. This form of command is useful for scripted setup.

Disabling SL-APM passwords

To disable the password, enter `DISABLE PASSWORD`.

This command disables the password protection feature. If the password is disabled, SSH and Telnet access are also disabled.

Resetting factory settings for SL-APM

To restore the SL-APM to its factory default settings, enter `RESET FACTORY`.

This command restores SL-APM to factory settings, including no password and Ethernet access, and then performs a reboot.

> ⚠ **WARNING:** When you enter `RESET FACTORY`, SL-APM erases your entire configuration. Before resetting factory defaults, consider saving your configuration. For more information on duplicating your configuration, see "Duplicating the configuration (on page 18)".

Working with accounts

SL-APM supports two login accounts (including the built-in Administrator account) on a single SL-APM board.

Adding an account

To add an account, enter `ADD ACCOUNT`. For example, enter

```
myslapm> add account "root"
Password must be at least 8 characters
Note: password will not show.
Enter account "root" password:
Enter account "root" password (again):
Saving password..done.

Account root enabled
myslapm>
```

After you enter this command with a valid new username, a prompt asking for a password appears. Enter the password. The new account is available for system login.

If you do not specify a password, and the username does not already exist, then you are prompted for a password.

All user accounts have the same permissions.

> **NOTE:** Login accounts and passwords are stored separate from the board configuration. A `SHOW CONFIG` command will not reveal any `ADD ACCOUNT` commands.

Removing an account

To remove an account, enter `REMOVE ACCOUNT "<username>"`

where:

"<username>" is the account username.

This command removes the specified account from the system. If the user does not exist, then an error message appears.

The Administrator account cannot be deleted.

Showing accounts

To show the existing defined accounts, including the reserved Administrator account, enter SHOW ACCOUNTS.

For example:

```
myslapm> show accounts
        Administrator
        root
myslapm>
```

Working with zones

SL-APM enables the addition, removal, and showing of chassis to a zone, and the saving of zones.

Adding zones

To add one or more chassis to a zone, enter

```
ADD ZONE <zone_name> [[<PORT#> <DMPORT#>]] | [<PORT#> ALL] | [ALL]
```

where:

- <zone_name> is the zone name.
- <PORT#> is the port number.
- <DMPORT#> is the distribution module port number.
- <PORT# ALL> is the port number.

For example:

```
myslapm> add zone red 1 2
Zone RED does not exist, would you like to create it? (Y/N) -> Yes
Note: there currently is no physical chassis plugged into Power Manager port 1,
Dist. Module port 2
RED zone added
Zone definition changed, do you want to save this data to the EEPROM? (Y/N) ->
No
Note: You can also save zone data to the EEPROM at any time with the SAVE ZONES
command
myslapm>
```

If the zone does not already exist, then it will be automatically created and the specified chassis will be added.

You can create up to four zones.

The parameters enable the addition of all chassis on all SL-APM ports, all the chassis plugged into an SL-APM port through a SL-APM Distribution Module) or a specific chassis on a specified SL-APM port and SL-APM Distribution Module port. The syntax is similar to other SL-APM commands such as `SHOW POWER` or `SHOW RACK` in how SL-APM and SL-APM Distribution Module ports are specified.

When adding a chassis to a zone, the chassis does not have to be present and plugged into the SL-APM. The SL-APM issues a message in such cases, and therefore, the chassis does not exist. Zone definitions do not require the hardware to be actually present . For SL-APM operations that might use zones (for example, `SET POWER BASELINE`), only those chassis that exist and are defined in the zone are considered for the operation.

For example:

```
ADD ZONE my_zone 1 5
```

Adds the chassis plugged into SL-APM Distribution Module port 5 on SL-APM port 1 to zone MY_ZONE. If MY_ZONE did not already exist, it will be created.

```
ADD ZONE my_zone 1 all
```

Adds all the chassis plugged into an SL-APM Distribution Module on SL-APM port 1.

```
ADD ZONE my_zone all
```

Adds all chassis on the SL-APM to zone MY_ZONE.

```
ADD ZONE BLUE 1 ALL 2 ALL 3 1
```

You can also use ALL by itself instead of a PORT DMPORT pair.

For example:

```
ADD ZONE BLUE ALL
```

Zones cannot overlap.

Removing zones

To remove one or more chassis from a zone definition, enter

```
REMOVE ZONE <zone_name> [[<PORT#> <DMPORT#>]] | [<PORT#> ALL] | [ALL]
```

where:

- `<zone_name>` is the zone name.
- `<PORT#>` is the port number.
- `<DMPORT#>` is the distribution module port number.
- `<PORT# ALL>` is the port number.

If no more chassis exist in the zone after the target chassis is removed, then the zone is automatically deleted. The syntax for indication which chassis is to be removed is identical to the `ADD ZONE` command.

For example:

```
REMOVE ZONE my_zone ALL
```

Removes all chassis from the zone MY_ZONE. This command also deletes the zone definition of MY_ZONE because no chassis is associated with it.

```
REMOVE ZONE my_zone 1 ALL
```

Removes all chassis plugged into the SL-APM Distribution Module on APM port 1.

Showing zones

To display all the currently defined zones and their respective member chassis, enter `SHOW ZONES`.

For example:

```
myslapm> show zones
Zone BLUE:
        Power Manager port 1:
                all Dist. Module ports included
Zone RED:
        Power Manager port 1:
                Dist. Module port 2
myslapm>
```

Saving zones

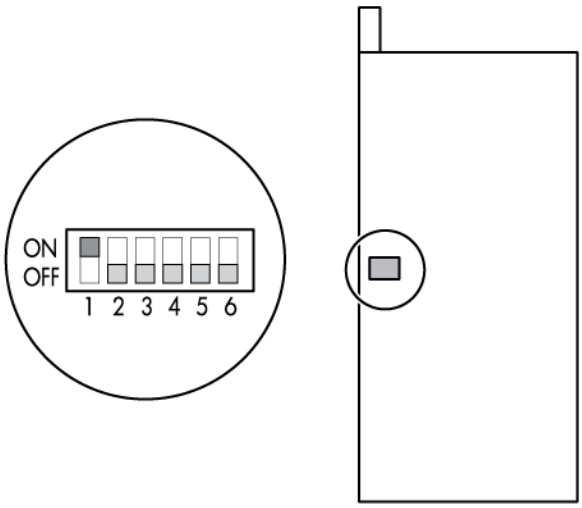
To commit the defined zones and their member chassis to the on-board EEPROM, enter `SAVE ZONES`.

You can define and save up to four zones. These zones are automatically loaded from the EEPROM when the board is reset.

Using the security override

If you forget your password, the SL-APM has an override switch to use. To activate this switch:

1. Remove the SL-APM controller from the SL-APM enclosure.
2. Locate the switches.



3. Set switch 1 to **ON.**
4. Reinsert the SL-APM controller into the SL-APM enclosure.
5. Log into the SL-APM using the serial port because SSH and Telnet are disabled due to the password override.
6. You can either reset or disable the password.

- To reset the password, enter `SET PASSWORD`. For more information, see "Setting SL-APM passwords (on page 45)".
- To disable the password, enter `DISABLE PASSWORD`, and then `SAVE`. For more information, see "Disabling SL-APM passwords (on page 46)".

7. Remove the SL-APM controller from the SL-APM enclosure.
8. Locate the switches.
9. Set switch 1 to **OFF**.
10. Reinsert the SL-APM controller into the SL-APM enclosure.

Showing configurations

To show the configuration, enter `SHOW CONFIG`. A list of commands representing the configuration of SL-APM appears.

Using the help

To access the help, enter `HELP`. The following listing appears:

```
SL-APM> help
CLEAR           Empty log entries
CONFIG          Configure SL-APM
DISABLE         Turn off board features
ENABLE          Turn on board features
EXIT            Exit CLI
HELP            Show help messages
LOGOUT          Exit CLI
PING            Ping a remote host
REBOOT          Reboot firmware
RESET           Reset SL-APM
SAVE            Save SL-APM configuration
SET             Set board configuration
SHOW            Display information
UPGRADE         Pull in new firmware
```

Each listing, in turn, has its own listings. For example, entering `HELP CLEAR`, the following listing appears:

```
SL-APM> help clear

        CLEAR           Empty log entries
        FAULTS          Empty the fault log
        LOG             Empty system log
        SCREEN          Clear the screen
```

This listing shows the items that you can clear:

- To empty the fault log, enter `CLEAR FAULTS`.
- To empty the system log, enter `CLEAR LOG`.
- To clear the screen, enter `CLEAR SCREEN`.

Setting the name

To set the name that will appear in the log and syslog entries, enter `SET NAME "<name>"`. For example:

```
SET NAME "alphabravo"
```

Setting the time

To set the time, enter `SET TIME <month> <day> <year> <hour> <minute>`

where:

- `<month>` is the month.
- `<day>` is the day.
- `<year>` is the year.
- `<hour>` is the hour, in 24-hour format. For example, enter 3:00 p.m. as 15.
- `<minute>` is the minute.

SL-APM does not automatically adjust for Daylight Savings Time.

The time remains on this setting until you issue the `RESET FACTORY` command.

Setting the session timeout

To set the SSH and Telnet inactivity timeout, enter `SET TIMEOUT {<timeout_value> | NONE}`

where `<timeout_value>` is the timeout value measured in seconds.

For example, to set a 30-second timeout, enter:

```
SET TIMEOUT 30
```

If you specify `NONE`, then no timeouts are set. For example, enter:

```
SET TIMEOUT NONE
```

Setting the UID LED

To activate the UID LED, enter `SET UID ON <PORT#> <DMPORT#>`.

To deactivate the UID LED, enter `SET UID OFF <PORT#> <DMPORT#>`.

where:

- `<PORT#>` is the SL-APM, PDM1, or PDM2 port numbers.
- `<DMPORT#>` is the SL-APM Distribution Module port number or the HP Intelligent Modular PDU Extension Bar outlet number.

Showing information

To show information, enter `SHOW INFO`. The following information appears:

- Manufacturer
- Product Name
- Part Number
- Spare Part Number

- Serial Number
- FRU File ID

Showing the name

To show the name, enter `SHOW NAME`. The name appears.

As an example, the following text appears on the screen:

```
SL-APM> show name
SL-APM
```

Showing the time

To show the time, enter `SHOW TIME`. The time appears.

As an example, the following text appears on the screen:

```
SL-APM> show time
WED JAN 13 12:56:21 2010
```

Showing the version

To show the version, enter `SHOW VERSION`. The version information appears.

For example, the following text appears:

```
SL-APM> show version

HP ProLiant SL Advanced Power Manager
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Version 1.40
Power Manager located in slot 1
Build time was Sep 20 2011, 00:00:00
Power Manager Hardware revision 1h
Dist. Module at port 1 FW:1h, BL:1h, HW:2h
```

To show the HP Power Management Controller Utility hardware and firmware versions as well as the license status of all servers in the enclosures, enter `SHOW VERSION ALL`.

Rebooting and resetting factory settings

To reboot, enter `REBOOT`. Unsaved configuration settings are lost.

Performing a reset

To reset, enter `RESET`. Unsaved configuration settings are lost.

Clearing the screen

To clear the session screen, `CLEAR SCREEN`.

Resetting factory settings

To reset the factory settings, enter `RESET FACTORY`.

All configuration and password settings will be lost. Password access will be disabled. Network access will be prevented due to disabled password.

Exiting, logging out, or quitting SL-APM

To exit enter one of the following: `EXIT, LOGOUT,` enter `QUIT`.

Using SNMP

SNMP overview

The architectural model for SNMP contains these components:

- At least one network management station with manager software. A network management station is a host running an application that manages the network. The network management applications request information from the agents, put the information into a database, and then translate messages into a readable format.
- Network Agents. Network agents are managed devices containing agent software. Agents might be hosts, gateway systems, or media devices such as bridges, hubs, or multiplexors. These agents perform the network management functions requested by the network management stations.
- Network management protocol. SNMP enables network management stations to monitor and control network devices. Stations and agents use SNMP to exchange management information. SNMP describes how agents and managers communicate and defines the types of information that can be exchanged.

Enabling SNMP

To enable the SNMP protocol stack and agent in SL-APM, enter `ENABLE SNMP`.

To disable the SNMP protocol stack and agent, enter `DISABLE SNMP`.

When you enter `DISABLE SNMP`, SL-APM no longer responds to SNMP. This state is the default.

Displaying SNMP parameters

Enter `SHOW SNMP`.

As an example, the following text might appear on screen:

```
> show snmp
SNMP agent is enabled

SNMP Read-only community string is "public"
SNMP Read-write community string is "private"

SNMP traps are sent to 16.83.185.73

SNMP system group values:
        SysDescription: HP SL Advanced Power Manager
        sysUptime:      33658723
        sysContact:
        sysName:        alphabravo
        sysLocation:    Chicago
```

If you do not have a particular variable entered, the space for that variable is left blank. In this example, no contact information has been entered.

Setting the SNMP read-only community string

To set the SNMP read-only community string, enter `SET SNMP RO "<community_string>"`. For example, enter:

```
SET SNMP RO "alphabravo"
```

Setting the SNMP read-write community string

To set the SNMP read-write community string, enter `SET SNMP RW "<community_string>"`. For example, enter:

```
SET SNMP RW "alphabravo"
```

Setting the SNMP contact

To set the `sysContact` field, enter `SET SNMP CONTACT "<sysContact>"`. For example, enter:

```
SET SNMP CONTACT "alphabravo"
```

Setting the SNMP location

To set the `sysLocation` field, enter `SET SNMP LOCATION "<sysLocation>"`. For example, enter:

```
SET SNMP LOCATION "alphabravo"
```

Setting SNMP trap destinations

To set the IP address for SNMP traps, enter `SET SNMP TRAPDEST <<ip_addresses>|NONE>`. For example, enter:

```
SET SNMP TRAPDEST x.x.x.x
```

You can set up to four SNMP traps at once. For example, enter:

```
SET SNMP TRAPDEST x.x.x.x y.y.y.y z.z.z.z a.a.a.a
```

If you specify `NONE`, then no traps are set. For example, enter:

```
SET SNMP TRAPDEST NONE
```

SL-APM supports the following SNMP traps:

- cpqRackNameChanged
- cpqRackEnclosureRemoved
- cpqRackEnclosureInserted
- cpqRackEnclosureFanRemoved *
- cpqRackEnclosureFanInserted *
- cpqRackEnclosureFanFailed
- cpqRackEnclosureFanOK
- cpqRackPowerSupplyFailed

- cpqRackPowerSupplyOK
- cpqRackPowerSupplyRemoved
- cpqRackPowerSupplyInserted
- cpqRackServerBladeRemoved
- cpqRackServerBladeInserted

  * Not supported on HP ProLiant s6500 Chassis

SNMP support of cpqHoSwRunningTable

The first element of this SNMP table lists the SL-APM base firmware itself under cpqHoSwRunningName and cpqHoSwRunningDesc with cpqHoSwRunningVersion listing the correct version of the SL-APM firmware.

Components that are listed in the cpqHoSwRunningTable are:

- SNMP
- SSH
- syslogd
- Telnet

The table entry cpqHoSWRunningState is set to either Running (2) or Stopped (3) to reflect whether that service is enabled or not. The SNMP service is listed as "Running" when accessed through this MIB item.

All other items in this table are unsupported and will return their respective static return value for “unknown.”

The rows appear in this order:

- SL-APM base firmware
- Telnet
- SSH
- SNMP
- syslogd

The following figure shows a sample table view of cpqHoSwRunningTable.

	1	2	3	4	5
cpqHoSWRunningIndex	1	2	3	4	5
cpqHoSWRunningName	SL-APM	telnet	ssh	snmp	syslogd
cpqHoSWRunningDesc	HP ProLiant SL Advanced Power Manager	Telnet server	ssh daemon	snmp agent	syslog daemon
cpqHoSWRunningVersion	Version 1.20				
cpqHoSWRunningDate					
cpqHoSWRunningMonitor	other	other	other	other	other
cpqHoSWRunningState	other	started	started	started	stopped
cpqHoSWRunningCount	1	1	1	1	1
cpqHoSWRunningCountMin	1	1	1	1	1
cpqHoSWRunningCountMax	1	1	1	1	1
cpqHoSWRunningEventTime					
cpqHoSWRunningStatus	unknown	unknown	unknown	unknown	unknown
cpqHoSWRunningConfigStatus	unknown	unknown	unknown	unknown	unknown
cpqHoSWRunningIdentifier					
cpqHoSWRunningRedundancyMode	unknown	unknown	unknown	unknown	unknown

Firmware

Upgrading the firmware

You can perform firmware upgrades using either FTP or TFTP.

To perform an upgrade:

1. Place the firmware image file onto a system that provides an FTP or TFTP server and is accessible from the SL-APM network.
2. Log in to the SL-APM CLI interface using a serial port, Telnet, or SSH connection.
3. Depending on which protocol you choose, enter either of the following commands:.
   - `UPGRADE IMAGE FTP <ip_address> <"login_name"> <"password"> <"filename">`
   - `UPGRADE IMAGE TFTP <ip_address> <"filename">`

   where:
   - `<ip_address>` refers to the IP address of a server that contains the file to be transferred.
   - `<"login_name">` refers to the FTP user name on the server hosting the file.
   - `<"password">` refers to the password of the FTP user name.
   - `<"filename">` refers to the file to be transferred. To preserve case, enclose `<filename>` in quotes.

The login name, password, and filename must be in quotations. For example,

```
UPGRADE IMAGE FTP x.x.x.x "username" "alphabravo" "filename.bin"
```

Following the transfer, the SL-APM is automatically upgraded and reset to run the new image.

IMPORTANT: If an upgrade is performed using either a Telnet or a SSH, the connection to the SL-APM will be lost after the upgrade.

IMPORTANT: If the firmware upgrade process is interrupted, then SL-APM reverts to the factory default image.

NOTE: If you downgrade the firmware or a firmware recovery is performed, syntax error messages might appear as the module initializes with its previously-saved configuration. You can ignore these messages.

Troubleshooting

Alert messages

The following messages appear in SL-APM.

Message	Where this issue occurs	Required action
`There was an error transferring the file, image upgrade not performed.`	Firmware upgrade	Verify network connectivity, and then retry the firmware upgrade.
`Error upgrading firmware image.`	Firmware upgrade	Message appears with other logs describing the actual issue. Review logs to identify, and then resolve issue.
`Dist. Module on Power Manager Chassis port <#> has excessive errors and has been marked as failed.`	All modes of operation	Verify SL-APM and SL-APM Distribution Module cabling.
`Power Manager Chassis port <#> on Dist. Module <#> has excessive errors and has been marked as failed.`	All modes of operation	Verify SL-APM and SL-APM Distribution Module cabling.
`Power Manager Chassis rendered non functional, redundant Power Manager Chassis is not supported by this firmware version.`	Redundant SL-APM inserted into SL-APM enclosure	Remove both SL-APM controllers, and then reinsert only one controller.
`The SL enclosure on Power Manager port <#>, Dist. Module port <#> does not support the Power Manager.`	SL Power Management Controller at the named location does not support SL-APM.	Update the SL Power Management Controller in that chassis. If no update is available, the SL Power Management Controller does not offer support for SL-APM.

For messages not listed, contact HP Support (http://www.hp.com/support). For more information, see "Support and other resources (on page 86)."

Devices not discovered

If devices are not discovered, perform the following steps:

1. Check the link and power LEDs.
2. Check the cables.
3. Reboot SL-APM.

Commands

Clear faults

- **Command:**

  `CLEAR FAULTS`

- **Description:**

  Clears the fault log to have 0 entries.

Clear log

- **Command:**

  `CLEAR LOG`

- **Description:**

  Clears the event log to have 0 entries.

Clear screen

- **Command:**

  `CLEAR SCREEN`

- **Description:**

  Clears a VT100/ANSI compatible terminal of all characters. Places cursor at position 1,1.

Disable Ethernet

- **Command:**

  `DISABLE ETHERNET`

- **Description:**

  Disables network access, including SSH and Telnet access and remote syslog support..

Enable Ethernet

- **Command:**

  `ENABLE ETHERNET`

- **Description:**

  Enables network access. Requires a password to be set and enabled. SSH and Telnet access must be enabled or disabled separately. Also enables remote syslog support.

Disable telnet

- **Command:**

  `DISABLE TELNET`

- **Description:**

  Turns off telnet access to the SL-APM board. Existing sessions will not be logged out.

Enable telnet

- **Command:**

  `ENABLE TELNET`

- **Description:**

  Turns on Telnet access to the SL-APM.

Disable SSH

- **Command:**

  `DISABLE SSH`

- **Description:**

  Turns off SSH access to the SL-APM.

Enable SSH

- **Command:**

  `ENABLE SSH`

- **Description:**

  Turns on SSH access to the SL-APM.

Remove account

- **Command:**

  `REMOVE ACCOUNT "<username>"`

- **Description:**

  - Removes the specified account from the system.
  - If the user does not exist, then an error message appears. The Administrator account cannot be deleted.

Add account

- **Command:**

  `ADD ACCOUNT "<username>"`

- **Description**:
  - Adds a new user to the system. A single SL-APM can maintain two login accounts, including the built-in Administrator account. Valid characters for usernames are A-Z, a-z, 0-9, _, and '-'.
  - All user accounts have the same permissions.
  - A password for the new account will be prompted for after the command is entered with a valid new username. After the completion of the password entry, the new account is available for logging into the system.
  - If the password field is not specified, then the password appears after this command is entered and the username does not already exist.
  - Login accounts and passwords are stored separate from the board configuration. A `SHOW CONFIG` command will not reveal any `ADD ACCOUNT` commands.

Disable password

- **Command:**

  `DISABLE PASSWORD`

- **Description:**

  Disables the password protection feature. Disabling password protection also disables SSH and Telnet network access.

Enable password

- **Command:**

  `ENABLE PASSWORD`

- **Description:**

  Enables the password protection feature. SSH and Telnet access requires the password feature to be enabled.

Ping

- **Command:**

  `PING`

- **Description:**

  Verifies network connectivity. Requires administrator access and has no restrictions.

  As an example, the following text might appear on screen:

```
> ping x.x.x.x

Pinging x.x.x.x (x.x.x.x) with 64 bytes of data:
Reply from x.x.x.x bytes=64 time=0ms ttl=128
Reply from x.x.x.x bytes=64 time=0ms ttl=128
Reply from x.x.x.x bytes=64 time=0ms ttl=128
Reply from x.x.x.x bytes=64 time=0ms ttl=128

--- x.x.x.x ping statistics ---

4 packets transmitted, 4 received, 0% packet loss, time 4000 ms
rtt min/avg/max = 0/0/0 ms
```

Exit

- **Command:**

  `EXIT`

- **Description:**

  Same as `LOGOUT`.

Help

- **Command:**

  `HELP`

- **Description:**

  Displays a list of available commands.

Logout

- **Command:**

  `LOGOUT`

- **Description:**

  Exits the CLI. Exiting terminates SSH or Telnet network connections. Exiting a connection through the serial port will return the user to the Login prompt.

Quit

- **Command:**

  `QUIT`

- **Description:**

  Same as `LOGOUT`.

Reset

- **Command:**

  `RESET`

- **Description:**

  Reboots SL-APM. Unsaved configuration settings are lost.

Reboot

- **Command:**

  `REBOOT`

- **Description:**

Same as `RESET`.

Reset factory

> ⚠ **WARNING:** When you enter `RESET FACTORY`, SL-APM erases your entire configuration. Before resetting factory defaults, consider saving your configuration. For more information on duplicating your configuration, see "Duplicating the configuration (on page 18)".

- **Command:**

  `RESET FACTORY`

- **Description:**

  Restores SL-APM to factory settings (including no password and Ethernet disabled) and then reboots SL-APM.

Save

- **Command:**

  `SAVE`

- **Description:**

  Saves the current configuration to non-volatile memory.

Save config

- **Command:**

  `SAVE CONFIG`

- **Description:**

  Functionality identical to the `SAVE` command.

Set IP

- **Command:**

  `SET IP {DHCP | <IP_ADDRESS> <IP_MASK>}`

- **Description:**

  Assigns static IP address and subnet mask or can be used to configure DHCP. If setting IP address and subnet mask, both must be specified.

Set gateway

- **Command:**

  `SET GATEWAY {NONE | <IP_ADDRESS>}`

- **Description:**

  Assigns or removes gateway IP address.

Set name

- **Command:**

  ```
  SET NAME "<name>"
  ```

- **Description:**

  Assigns a name to SL-APM that will appear in the log and syslog entries. Name can be up to 40 characters in length.

Set password

- **Command:**

  ```
  SET PASSWORD
  SET PASSWORD "<password>"
  SET PASSWORD "<password>"|account_name
  ```

- **Description:**
  - Configures the Administrator account password. Until a password is set, both Telnet and SSH are disabled. The password must be between 8 and 40 characters, and can include:
    - Uppercase letters
    - Lowercase letters
    - Underscores (_)
    - Dashes (-)
    - At signs (@)
    - Pound signs (#)
    - Carets (^)
    - Ampersands (&)
    - Exclamation points (!)
    - Plus symbols (+)
    - Equal symbols (=)
    - Tilde (~)
    - Numerical values between 0–9
  - SL-APM differentiates a password from an account_name (you have a choice between the two parameters, but not both) by the fact that the “password” parameter is in quotes while the account_name parameter is not in quotes. If the account_name parameter is used, then you are prompted for the new password.

Set power

- **Command:**

  ```
  SET POWER {ON|OFF|ENABLE|DISABLE} {ALL | <PORT#> <DMPORT#> {<NODE#>|ALL}}
  ```

  where:

ALL is used when the command applies to all nodes. You can also use it when the command applies to all the server nodes in a particular SL server enclosure.

<PORT#> refers to the SL-APM, PDM1, or PDM2 port numbers.

<DMPORT#> refers to the SL-APM Distribution Module port number or HP Intelligent Modular PDU Extension Bar outlet number.

<NODE#> refers to the SL server node.

- **Description:**
  - Turns power on and off to SL enclosures.
  - SET POWER ALL shows the HP Power Management Controller Utility hardware and firmware versions as well as the license status of all servers in the enclosures.

Set serial

- **Command:**

  SET SERIAL <baud rate>

- **Description:**
  - Configure the serial console baud rate.
  - Serial access to the CLI will be by default 115200 bits/s, no parity, 8 data bits, and one stop bit ("115200 N 8 1"). You can configure these parameters through the CLI.
  - Valid baud rates are 300, 1200, 2400, 4800, 9600, 14400, 19200, and 115200.

Set syslog

- **Command:**

  SET SYSLOG {<ip_address>|NONE}

- **Description:**

  Sets or clears the sending of SL-APM log messages to a remote syslog server. Local logging is unaffected.

Set time

- **Command:**

  SET TIME <month> <day> <year> <hour> <minute>

  where:

  <month> is the month.

  <day> is the day.

  <year> is the year.

  <hour> is the hour, in 24-hour format. For example, enter 3:00 p.m. as 15.

  <minute> is the minute.

  SL-APM does not automatically adjust for Daylight Savings Time.

  The time remains on this setting until you issue the RESET FACTORY command.

- **Description:**
  - Sets the system time on the battery-backed clock.
  - All five parameters must be present. The hour parameter must be in 24-hour format.

Set timeout

- **Command:**

  `SET TIMEOUT {<timeout_value> | NONE}`

  where:

  `<timeout_value>` is the session timeout value measured in seconds. For example, to set a 30-second session timeout, enter:

  `SET TIMEOUT 30`

  If you specify `NONE`, then no session timeouts are set. For example, enter:

  `SET TIMEOUT NONE`

- **Description:**

  Sets the SSH and Telnet inactivity timeout.

Set power baseline

- **Command:**

  `SET POWER BASELINE`

- **Description:**

  Baseline or calibrate all servers that are connected to the SL-APM. After you have established a baseline for the configuration, it is saved into the EEPROM on the SL-APM and the configuration monitored for changes from the baseline configuration. Examples of changes to the configuration would include the removal or insertion of servers or chassis. If SL-APM is reset, the baseline is re-read from the EEPROM and compared to the discovered configuration after reset.

  The baseline is computed for the entire configuration and is not applicable to zones. When a power cap is set, the baseline data establishes the minimum and maximum power values that can be used for the cap. If you set a cap with a defined zone specified, then only that baseline data that was established for the enclosures and are within that zone are used to establish the minimum and maximum for the cap to that zone.

Set power cap

- **Command:**

  `SET POWER CAP <wattage>|NONE [zone_name]`

- **Description:**
  - Establishes a power cap for all the eligible chassis that are connected to the SL-APM.

    The wattage value, if provided, represents the total wattage to be allocated among all the chassis that are part of the baseline or partial baseline if a zone, if specified. This value is divided by the total maximum wattage established by the baseline to come up with a percentage cap value. This

percentage is then multiplied against each chassis maximum wattage value to arrive at an appropriate cap value for that individual chassis.

- If you specify NONE instead of a cap wattage value, then SL-APM removes all (or those in the specified zone, if desired) of the power caps.

Set asset info

- **Command:**

  `SET ASSETINFO [PDM1|PDM2] "<asset_tag_string>"`

- **Description:**
  - Enables SL-APM to set an asset tag. Supported only on the HP 60A PDU.
  - The `<asset_tag_string>` can be up to 32 characters in length. The string will be programmed into the PDU and can be retrieved with the `SHOW ASSETINFO` command.

Show accounts

- **Command:**

  `SHOW ACCOUNTS`

- **Description:**

  Shows the existing defined accounts, including the reserved Administrator account.

Show config

- **Command:**

  `SHOW CONFIG`

- **Description:**

  Displays the current configuration commands for SL-APM.

Show faults

- **Command:**

  `SHOW FAULTS`

- **Description:**

  Shows the fault log entries.

Show info

- **Command:**

  `SHOW INFO`

- **Description:**

  Shows information pertaining to the SL-APM and SL-APM Distribution Module, including MAC address, model number, and serial number.

Show log

- **Command:**

  `SHOW LOG`

- **Description:**

  Shows the event log.

Show syslog

- **Command:**

  `SHOW SYSLOG`

- **Description:**

  Shows the current syslog IP address configuration. This command does not show the actual contents of the syslog.

Show name

- **Command:**

  `SHOW NAME`

- **Description:**

  Displays the rack name.

Show power

- **Command:**

  `SHOW POWER`

  `SHOW POWER <PORT#>`

  `SHOW POWER <PORT#> <DMPORT#>`

  `SHOW POWER PDM`

  `SHOW POWER ALL`

  where:

  `<PORT#>` refers to the SL-APM, PDM1, or PDM2 port numbers.

  `<DMPORT#>` refers to the SL-APM Distribution Module port number or the HP Intelligent Modular PDU Extension Bar outlet number.

- **Description:**

  - Shows the rack power status.
  - `SHOW POWER ALL` shows the HP Power Management Controller Utility hardware and firmware versions as well as the license status of all servers in the enclosures.

Show rack

- **Command:**

```
SHOW RACK
SHOW RACK <PORT#>
SHOW RACK <PORT#> <DMPORT#>
SHOW RACK ALL
```

where:

<PORT#> refers to the SL-APM port.

<DMPORT#> refers to the SL-APM Distribution Module port.

- **Description:**
  - Shows the contents of the rack.
  - SHOW RACK ALL shows the HP Power Management Controller Utility hardware and firmware versions as well as the license status of all servers in the enclosures.

Show servers

- **Command:**

```
SHOW SERVERS
SHOW SERVERS <PORT#>
SHOW SERVERS <PORT#> <DMPORT#>
```

where:

<PORT#> refers to the SL-APM port.

<DMPORT#> refers to the SL-APM port.

- **Description:**

Shows the same information as the SHOW RACK and SHOW TOPOLOGY commands.

Show topology

- **Command:**

```
SHOW TOPOLOGY
SHOW TOPOLOGY <PORT#>
SHOW TOPOLOGY <PORT#> <DMPORT#>
SHOW TOPOLOGY ALL
```

where:

<PORT#> refers to the SL-APM port.

<DMPORT#> refers to the SL-APM Distribution Module port.

- **Description:**
  - Shows the same information as the SHOW RACK and SHOW SERVERS commands.
  - SHOW TOPOLOGY ALL shows the HP Power Management Controller Utility hardware and firmware versions as well as the license status of all servers in the enclosures.

Show asset info

- **Command:**

  `SHOW ASSETINFO`

  `SHOW ASSETINFO <PORT#>`

  `SHOW ASSETINFO <PORT#> <DMPORT#>`

  where:

  `<PORT#>` refers to the SL-APM port.

  `<DMPORT#>` refers to the SL-APM Distribution Module port.

- **Description:**
  - Shows the chassis in a rack in a report format.
  - Also requests and shows any asset tags from the chassis and any HP-sourced 60A PDUs that are in the rack.

Show MAC address

- **Command:**

  `SHOW MACADDR`

  `SHOW MACADDR <PORT#>`

  `SHOW MACADDR <PORT#> <DMPORT#>`

  where:

  `<PORT#>` refers to the SL-APM port.

  `<DMPORT#>` refers to the SL-APM Distribution Module port.

- **Description:**

  Shows the contents of the rack, including the MAC addresses of the individual SL server nodes, if available.

Show time

- **Command:**

  `SHOW TIME`

- **Description:**

  Displays the currently set system time.

Show power baseline

- **Command:**

  `SHOW POWER BASELINE`

- **Description:**

  Reports the currently established baseline data for all chassis that are connected to the SL-APM.

Show version

- **Command:**

  ```
  SHOW VERSION
  SHOW VERSION ALL
  ```

- **Description:**
  - Displays SL-APM firmware copyright, version, build date, and hardware version. Also displays SL-APM Distribution Module hardware and firmware versions.
  - `SHOW VERSION ALL` shows the HP Power Management Controller Utility hardware and firmware versions as well as the license status of all servers in the enclosures.

Upgrade image

- **Command:**
  - If using TFTP protocol for upgrading SL-APM, enter:

    ```
    UPGRADE IMAGE TFTP <ip_address> "<filename>"
    ```

  - If using FTP protocol for upgrading SL-APM, enter:

    ```
    UPGRADE IMAGE FTP <ip_address> "<username>" "<password>" "<filename>"
    ```

- **Description:**
  - Updates SL-APM firmware using the specified protocol. Protocol can be either FTP or TFTP. `<ip_address>` refers to the IP address of a server that contains the file to be transferred, and filename is the file to be transferred. Following the transfer, SL-APM will be upgraded and reset to run the new image.
  - The filename must be enclosed in quotes to preserve case.

Add zone

- **Command:**

  ```
  ADD ZONE <zone_name> [[<PORT#> <DMPORT#>]] | [<PORT#> ALL] | [ALL]
  ```

- **Description:**

  Adds one or more chassis to a zone named by <zone_name>. If the zone does not already exist, then it will be automatically created and the specified chassis will be added.

  You can create up to four zones.

  The parameters enable the addition of all chassis on all SL-APM ports, all the chassis plugged into an SL-APM port through a SL-APM Distribution Module) or a specific chassis on a specified SL-APM port and SL-APM Distribution Module port. The syntax is similar to other SL-APM commands such as SHOW POWER or SHOW RACK in how SL-APM and SL-APM Distribution Module ports are specified.

  When adding a chassis to a zone, the chassis does not have to be present and plugged into the SL-APM. The SL-APM issues a message in such cases, and therefore, the chassis does not exist. Zone definitions do not require the hardware to be present . For SL-APM operations that might use zones (for example, SET POWER BASELINE), only those chassis that exist and are defined in the zone are considered for the operation.

  Examples:

`ADD ZONE my_zone 1 5`

Adds the chassis plugged into SL-APM Distribution Module port 5 on SL-APM port 1 to zone MY_ZONE. If MY_ZONE did not already exist, it will be created.

`ADD ZONE my_zone 1 all`

Adds all the chassis plugged into an SL-APM Distribution Module on SL-APM port 1.

`ADD ZONE my_zone all`

Adds all chassis on the SL-APM to zone MY_ZONE.

`ADD ZONE BLUE 1 ALL 2 ALL 3 1`

You can also use ALL by itself instead of a PORT DMPORT pair.

For example:

`ADD ZONE BLUE ALL`

Zones cannot overlap.

Save zones

- **Command:**

  `SAVE ZONES`

- **Description:**
  - Commits the defined zones and their member chassis to the on-board EEPROM.
  - You can define and save up to four zones. These zones are automatically loaded from the EEPROM when the board is reset.

Show zones

- **Command:**

  `SHOW ZONES`

- **Description:**

  Displays all the currently defined zones and their respective member chassis.

Remove zone

- **Command:**

  `REMOVE ZONE <zone_name> [[<PORT#> <DMPORT#>]] | [<PORT#> ALL] | [ALL]`

  where:

  `<zone_name>` is the zone name.

  `<PORT#>` is the port number.

  `<DMPORT#>` is the distribution module port number.

  `<PORT# ALL>` is the port number.

  If no more chassis exist in the zone after the target chassis is removed, then the zone is automatically deleted. The syntax for indication which chassis is to be removed is identical to the `ADD ZONE` command.

- **Description:**

Removes one or more chassis from a zone definition.

Enable pullpower

- **Command**

  `ENABLE POLLPOWER`

- **Description**

  Enables background process that polls each server for power usage.

Disable pullpower

- **Command**

  `DISABLE POLLPOWER`

- **Description**

  Disables background process that polls each server for power usage.

Enable SNMP

- **Command:**

  `ENABLE SNMP`

- **Description:**

  Turns on SNMP protocol and agent in SL-APM.

Disable SNMP

- **Command:**

  `DISABLE SNMP`

- **Description:**

  Turns off the SNMP protocol stack and agent. SL-APM no longer responds to SNMP. This state is the default.

Show SNMP

- **Command:**

  `SHOW SNMP`

- **Description:**

  Displays all parameters related to SNMP including whether SNMP is enabled, read-only and read-write community strings, SNMP trap destinations, and the contact, name, and location settings.

Set SNMP RO

- **Command:**

```
SET SNMP RO "<community_string>"
```

- **Description:**

  Sets the SNMP read-only public string to the string specified as a parameter.

Set SNMP RW

- **Command:**

```
SET SNMP RW "<community_string>"
```

- **Description:**

  Sets the read-write string.

Set SNMP contact

- **Command:**

```
SET SNMP CONTACT "<sysContact>"
```

- **Description:**

  Sets the MIB II sysContact field.

Set SNMP location

- **Command:**

```
SET SNMP LOCATION "<sysLocation>"
```

- **Description:**

  Sets the MIB II sysLocation field.

Set SNMP trapdest

- **Command:**

```
SET SNMP TRAPDEST <<ip_addresses>|NONE>
```

- **Description:**
  - Sets the IP addresses where SNMP traps are sent.

    You can set up to four SNMP trap destinations. For example, enter:

    `SET SNMP TRAPDEST x.x.x.x y.y.y.y z.z.z.z a.a.a.a`

    If you specify `NONE`, then no trap destinations are set. For example, enter:

    `SET SNMP TRAPDEST NONE`
  - SL-APM supports the following SNMP traps:

    NOTE: SNMP traps denoted by an * are not supported on the HP ProLiant s6500 Chassis.

    — cpqRackNameChanged

    — cpqRackEnclosureRemoved

- cpqRackEnclosureInserted
- cpqRackEnclosureFanRemoved *
- cpqRackEnclosureFanInserted *
- cpqRackEnclosureFanFailed
- cpqRackEnclosureFanOK
- cpqRackPowerSupplyFailed
- cpqRackPowerSupplyOK
- cpqRackPowerSupplyRemoved
- cpqRackPowerSupplyInserted
- cpqRackServerBladeRemoved
- cpqRackServerBladeInserted

Supported MIB objects

Supported cpqRack MIB objects

Object name	Object identifier	Notes
Compaq	1.3.6.1.4.1.232	—
cpqRackInfo	1.3.6.1.4.1.232.22	—
cpqRackMibRev	1.3.6.1.4.1.232.22.1	—
cpqRackMibRevMajor	1.3.6.1.4.1.232.22.1.1	—
cpqRackMibRevMinor	1.3.6.1.4.1.232.22.1.2	—
cpqRackMibCondition	1.3.6.1.4.1.232.22.1.3	—
cpqRackComponent	1.3.6.1.4.1.232.22.2	—
cpqRackAsset	1.3.6.1.4.1.232.22.2.2	—
cpqRackAssetTable	1.3.6.1.4.1.232.22.2.2.1	—
cpqRackAssetEntry	1.3.6.1.4.1.232.22.2.2.1.1	—
cpqRackAssetIndex	1.3.6.1.4.1.232.22.2.2.1.1.1	—
cpqRackName	1.3.6.1.4.1.232.22.2.2.1.1.2	—
cpqRackUid	1.3.6.1.4.1.232.22.2.2.1.1.3	Always returns -1.
cpqRackSerialNum	1.3.6.1.4.1.232.22.2.2.1.1.4	—
cpqRackTrapSequenceNum	1.3.6.1.4.1.232.22.2.2.1.1.5	Always returns -1.
cpqRackHeight	1.3.6.1.4.1.232.22.2.2.1.1.6	Always returns -1.
cpqRackWidth	1.3.6.1.4.1.232.22.2.2.1.1.7	Always returns -1.
cpqRackDepth	1.3.6.1.4.1.232.22.2.2.1.1.8	—
cpqRackEnclosure	1.3.6.1.4.1.232.22.2.3	—
cpqRackCommonEnclosure	1.3.6.1.4.1.232.22.2.3.1	—
cpqRackCommonEnclosureTable	1.3.6.1.4.1.232.22.2.3.1.1	—
cpqRackCommonEnclosureEntry	1.3.6.1.4.1.232.22.2.3.1.1.1	—
cpqRackCommonEnclosureRack	1.3.6.1.4.1.232.22.2.3.1.1.1.1	—
cpqRackCommonEnclosureHeight	1.3.6.1.4.1.232.22.2.3.1.1.1.12	Always returns -1.
cpqRackCommonEnclosureWidth	1.3.6.1.4.1.232.22.2.3.1.1.1.13	Always returns -1.
cpqRackCommonEnclosureDepth	1.3.6.1.4.1.232.22.2.3.1.1.1.14	Always returns -1.
cpqRackCommonEnclosureTrapSequenceNum	1.3.6.1.4.1.232.22.2.3.1.1.1.15	Always returns -1.
cpqRackCommonEnclosureCondition	1.3.6.1.4.1.232.22.2.3.1.1.1.16	Always returns -1.
cpqRackCommonEnclosureHasServerBlades	1.3.6.1.4.1.232.22.2.3.1.1.1.17	—
cpqRackCommonEnclosureHasPowerSupplies	1.3.6.1.4.1.232.22.2.3.1.1.1.18	—
cpqRackCommonEnclosureHasNetConnectors	1.3.6.1.4.1.232.22.2.3.1.1.1.19	Always returns -1.
cpqRackCommonEnclosureIndex	1.3.6.1.4.1.232.22.2.3.1.1.1.2	—
cpqRackCommonEnclosureHasTempSensors	1.3.6.1.4.1.232.22.2.3.1.1.1.20	Always returns -1.
cpqRackCommonEnclosureHasFans	1.3.6.1.4.1.232.22.2.3.1.1.1.21	—
cpqRackCommonEnclosureHasFuses	1.3.6.1.4.1.232.22.2.3.1.1.1.22	Always returns -1.
cpqRackCommonEnclosureMgmtUID	1.3.6.1.4.1.232.22.2.3.1.1.1.23	—

Object name	Object identifier	Notes
cpqRackCommonEnclosureSerialNumPrev	1.3.6.1.4.1.232.22.2.3.1.1.1.24	—
cpqRackCommonEnclosureSerialNumNext	1.3.6.1.4.1.232.22.2.3.1.1.1.25	—
cpqRackCommonEnclosureAddress	1.3.6.1.4.1.232.22.2.3.1.1.1.26	Always returns -1.
cpqRackCommonEnclosureProductId	1.3.6.1.4.1.232.22.2.3.1.1.1.27	Always returns an empty string "".
cpqRackCommonEnclosureProductIdPrev	1.3.6.1.4.1.232.22.2.3.1.1.1.28	Always returns an empty string "".
cpqRackCommonEnclosureProductIdNext	1.3.6.1.4.1.232.22.2.3.1.1.1.29	Always returns an empty string "".
cpqRackCommonEnclosureModel	1.3.6.1.4.1.232.22.2.3.1.1.1.3	—
cpqRackCommonEnclosureUUID	1.3.6.1.4.1.232.22.2.3.1.1.1.30	Always returns an empty string "".
cpqRackCommonEnclosureUUIDPrev	1.3.6.1.4.1.232.22.2.3.1.1.1.31	Always returns an empty string "".
cpqRackCommonEnclosureUUIDNext	1.3.6.1.4.1.232.22.2.3.1.1.1.32	Always returns an empty string "".
cpqRackCommonEnclosureFanWattage	1.3.6.1.4.1.232.22.2.3.1.1.1.34	—
cpqRackCommonEnclosureAssetTag	1.3.6.1.4.1.232.22.2.3.1.1.1.4	Always returns an empty string "".
cpqRackCommonEnclosurePartNumber	1.3.6.1.4.1.232.22.2.3.1.1.1.5	Always returns an empty string "".
cpqRackCommonEnclosureSparePartNumber	1.3.6.1.4.1.232.22.2.3.1.1.1.6	—
cpqRackCommonEnclosureSerialNum	1.3.6.1.4.1.232.22.2.3.1.1.1.7	—
cpqRackCommonEnclosureFWRev	1.3.6.1.4.1.232.22.2.3.1.1.1.8	—
cpqRackCommonEnclosureName	1.3.6.1.4.1.232.22.2.3.1.1.1.9	—
cpqRackCommonEnclosureFanTable	1.3.6.1.4.1.232.22.2.3.1.3	—
cpqRackCommonEnclosureFanEntry	1.3.6.1.4.1.232.22.2.3.1.3.1	—
cpqRackCommonEnclosureFanRack	1.3.6.1.4.1.232.22.2.3.1.3.1.1	—
cpqRackCommonEnclosureFanCondition	1.3.6.1.4.1.232.22.2.3.1.3.1.11	—
cpqRackCommonEnclosureFanChassis	1.3.6.1.4.1.232.22.2.3.1.3.1.2	—
cpqRackCommonEnclosureFanIndex	1.3.6.1.4.1.232.22.2.3.1.3.1.3	—
cpqRackCommonEnclosureFanLocation	1.3.6.1.4.1.232.22.2.3.1.3.1.5	—
cpqRackCommonEnclosureManagerTable	1.3.6.1.4.1.232.22.2.3.1.6	—
cpqRackCommonEnclosureManagerEntry	1.3.6.1.4.1.232.22.2.3.1.6.1	—
cpqRackCommonEnclosureManagerRack	1.3.6.1.4.1.232.22.2.3.1.6.1.1	—
cpqRackCommonEnclosureManagerPresent	1.3.6.1.4.1.232.22.2.3.1.6.1.10	—
cpqRackCommonEnclosureManagerFWRev	1.3.6.1.4.1.232.22.2.3.1.6.1.15	—
cpqRackServerEnclosureTable	1.3.6.1.4.1.232.22.2.3.2.1	—
cpqRackServerEnclosureEntry	1.3.6.1.4.1.232.22.2.3.2.1.1	—
cpqRackServerEnclosureRack	1.3.6.1.4.1.232.22.2.3.2.1.1.1	—
cpqRackServerEnclosureIndex	1.3.6.1.4.1.232.22.2.3.2.1.1.2	—
cpqRackServerEnclosureName	1.3.6.1.4.1.232.22.2.3.2.1.1.3	Always returns an empty string "".
cpqRackServerEnclosureMaxNumBlades	1.3.6.1.4.1.232.22.2.3.2.1.1.4	—
cpqRackServer	1.3.6.1.4.1.232.22.2.4	—

Object name	Object identifier	Notes
cpqRackServerBlade	1.3.6.1.4.1.232.22.2.4.1	—
cpqRackSystemTime	1.3.6.1.4.1.232.22.2.4.1.0	—
cpqRackServerBladeTable	1.3.6.1.4.1.232.22.2.4.1.1	—
cpqRackServerBladeEntry	1.3.6.1.4.1.232.22.2.4.1.1.1	—
cpqRackServerBladeRack	1.3.6.1.4.1.232.22.2.4.1.1.1.1	—
cpqRackServerBladeWidth	1.3.6.1.4.1.232.22.2.4.1.1.1.10	—
cpqRackServerBladeDepth	1.3.6.1.4.1.232.22.2.4.1.1.1.11	Always returns -1.
cpqRackServerBladePresent	1.3.6.1.4.1.232.22.2.4.1.1.1.12	—
cpqRackServerBladeHasFuses	1.3.6.1.4.1.232.22.2.4.1.1.1.13	—
cpqRackServerBladeEnclosureSerialNum	1.3.6.1.4.1.232.22.2.4.1.1.1.14	—
cpqRackServerBladeSlotsUsed	1.3.6.1.4.1.232.22.2.4.1.1.1.15	—
cpqRackServerBladeSerialNum	1.3.6.1.4.1.232.22.2.4.1.1.1.16	Always returns an empty string "".
cpqRackServerBladeProductId	1.3.6.1.4.1.232.22.2.4.1.1.1.17	Always returns an empty string "".
cpqRackServerBladeChassis	1.3.6.1.4.1.232.22.2.4.1.1.1.2	—
cpqRackServerBladeIndex	1.3.6.1.4.1.232.22.2.4.1.1.1.3	—
cpqRackServerBladeName	1.3.6.1.4.1.232.22.2.4.1.1.1.4	Always returns an empty string "".
cpqRackServerBladeEnclosureName	1.3.6.1.4.1.232.22.2.4.1.1.1.5	Always returns an empty string "".
cpqRackServerBladePartNumber	1.3.6.1.4.1.232.22.2.4.1.1.1.6	Always returns an empty string "".
cpqRackServerBladeSparePartNumber	1.3.6.1.4.1.232.22.2.4.1.1.1.7	Always returns an empty string "".
cpqRackServerBladePosition	1.3.6.1.4.1.232.22.2.4.1.1.1.8	—
cpqRackServerBladeHeight	1.3.6.1.4.1.232.22.2.4.1.1.1.9	—
cpqRackPollPower	1.3.6.1.4.1.232.22.2.4.2.0	—
cpqRackPower	1.3.6.1.4.1.232.22.2.5	—
cpqRackPowerSupply	1.3.6.1.4.1.232.22.2.5.1	—
cpqRackPowerSupplyTable	1.3.6.1.4.1.232.22.2.5.1.1	—
cpqRackPowerSupplyEntry	1.3.6.1.4.1.232.22.2.5.1.1.1	—
cpqRackPowerSupplyRack	1.3.6.1.4.1.232.22.2.5.1.1.1.1	—
cpqRackPowerSupplyPresent	1.3.6.1.4.1.232.22.2.5.1.1.1.16	—
cpqRackPowerSupplyCondition	1.3.6.1.4.1.232.22.2.5.1.1.1.17	—
cpqRackPowerSupplyEnclosureSerialNum	1.3.6.1.4.1.232.22.2.5.1.1.1.18	—
cpqRackPowerSupplyChassis	1.3.6.1.4.1.232.22.2.5.1.1.1.2	—
cpqRackPowerSupplyIndex	1.3.6.1.4.1.232.22.2.5.1.1.1.3	—
cpqRackPowerSupplyEnclosureName	1.3.6.1.4.1.232.22.2.5.1.1.1.4	—
cpqRackNameChanged	1.3.6.1.4.1.232.22001	—
cpqRackEnclosureRemoved	1.3.6.1.4.1.232.22003	—
cpqRackEnclosureInserted	1.3.6.1.4.1.232.22004	—
cpqRackEnclosureFanFailed	1.3.6.1.4.1.232.22008	—
cpqRackEnclosureFanOk	1.3.6.1.4.1.232.22010	—
cpqRackEnclosureFanRemoved	1.3.6.1.4.1.232.22011	Supported with

Object name	Object identifier	Notes
		exception of HP ProLiant s6500 Chassis
cpqRackEnclosureFanInserted	1.3.6.1.4.1.232.22012	Supported with exception of HP ProLiant s6500 Chassis
cpqRackPowerSupplyFailed	1.3.6.1.4.1.232.22013	—
cpqRackPowerSupplyOk	1.3.6.1.4.1.232.22015	—
cpqRackPowerSupplyRemoved	1.3.6.1.4.1.232.22016	—
cpqRackPowerSupplyInserted	1.3.6.1.4.1.232.22017	—
cpqRackServerBladeRemoved	1.3.6.1.4.1.232.22028	—
cpqRackServerBladeInserted	1.3.6.1.4.1.232.22029	—
cpqRackServerBladePoweredOn	1.3.6.1.4.1.232.22069	—
cpqRackServerBladePoweredOff	1.3.6.1.4.1.232.22070	—

Supported cpqHostOs MIB objects

Object name	Object identifier	Notes
compaq	1.3.6.1.4.1.232	
cpqHostOs	1.3.6.1.4.1.232.11	
cpqHoMibRev	1.3.6.1.4.1.232.11.1	
cpqRackMibRevMajor	1.3.6.1.4.1.232.22.1.1	
cpqRackMibRevMinor	1.3.6.1.4.1.232.22.1.2	
cpqRackMibCondition	1.3.6.1.4.1.232.22.1.3	
cpqHoSystemStatus	1.3.6.1.4.1.232.11.2.10	
cpqHoMibStatusArray	1.3.6.1.4.1.232.11.2.10.1	
cpqHoConfigChangedDate	1.3.6.1.4.1.232.11.2.10.2	
cpqHoGUID	1.3.6.1.4.1.232.11.2.10.3	Always returns an empty string "".
cpqHoCodeServer	1.3.6.1.4.1.232.11.2.10.4	Always returns -1.
cpqHoWebMgmtPort	1.3.6.1.4.1.232.11.2.10.5	Always returns -1.
cpqHoGUIDCanonical	1.3.6.1.4.1.232.11.2.10.6	Always returns an empty string "".

Supported rfc1213 MIB objects

Object name	Object identifier
mib-2	1.3.6.1.2.1
system	1.3.6.1.2.1.1
sysDescr	1.3.6.1.2.1.1.1
sysObjectID	1.3.6.1.2.1.1.2
sysUpTime	1.3.6.1.2.1.1.3

Object name	Object identifier
sysContact	1.3.6.1.2.1.1.4
sysName	1.3.6.1.2.1.1.5
sysLocation	1.3.6.1.2.1.1.6
sysServices	1.3.6.1.2.1.1.7
transmission	1.3.6.1.2.1.10
snmp	1.3.6.1.2.1.11
snmpInPkts	1.3.6.1.2.1.11.1
snmpInBadValues	1.3.6.1.2.1.11.10
snmpInReadOnlys	1.3.6.1.2.1.11.11
snmpInGenErrs	1.3.6.1.2.1.11.12
snmpInTotalReqVars	1.3.6.1.2.1.11.13
snmpInTotalSetVars	1.3.6.1.2.1.11.14
snmpInGetRequests	1.3.6.1.2.1.11.15
snmpInGetNexts	1.3.6.1.2.1.11.16
snmpInSetRequests	1.3.6.1.2.1.11.17
snmpInGetResponses	1.3.6.1.2.1.11.18
snmpInTraps	1.3.6.1.2.1.11.19
snmpOutPkts	1.3.6.1.2.1.11.2
snmpOutTooBigs	1.3.6.1.2.1.11.20
snmpOutNoSuchNames	1.3.6.1.2.1.11.21
snmpOutBadValues	1.3.6.1.2.1.11.22
snmpOutGenErrs 1.3.6.1.2.1.11.24	1.3.6.1.2.1.11.24
snmpOutGetRequests	1.3.6.1.2.1.11.25
snmpOutGetNexts	1.3.6.1.2.1.11.26
snmpOutSetRequests	1.3.6.1.2.1.11.27
snmpOutGetResponses	1.3.6.1.2.1.11.28
snmpOutTraps	1.3.6.1.2.1.11.29
snmpInBadVersions	1.3.6.1.2.1.11.3
snmpEnableAuthenTraps	1.3.6.1.2.1.11.30
snmpInBadCommunityNames	1.3.6.1.2.1.11.4
snmpInBadCommunityUses	1.3.6.1.2.1.11.5
snmpInASNParseErrs	1.3.6.1.2.1.11.6
snmpInTooBigs	1.3.6.1.2.1.11.8
snmpInNoSuchNames	1.3.6.1.2.1.11.9
interfaces	1.3.6.1.2.1.2

Object name	Object identifier
ifNumber	1.3.6.1.2.1.2.1
ifNumber	1.3.6.1.2.1.2.1
ifTable	1.3.6.1.2.1.2.2
ifEntry	1.3.6.1.2.1.2.2.1
ifIndex	1.3.6.1.2.1.2.2.1.1
ifInOctets	1.3.6.1.2.1.2.2.1.10
ifInUcastPkts	1.3.6.1.2.1.2.2.1.11
ifInNUcastPkts	1.3.6.1.2.1.2.2.1.12
ifInDiscards	1.3.6.1.2.1.2.2.1.13
ifInErrors	1.3.6.1.2.1.2.2.1.14
ifInUnknownProtos	1.3.6.1.2.1.2.2.1.15
ifOutOctets	1.3.6.1.2.1.2.2.1.16
ifOutUcastPkts	1.3.6.1.2.1.2.2.1.17
ifOutNUcastPkts	1.3.6.1.2.1.2.2.1.18
ifOutDiscards	1.3.6.1.2.1.2.2.1.19
ifDescr	1.3.6.1.2.1.2.2.1.2
ifOutErrors	1.3.6.1.2.1.2.2.1.20
ifOutQLen	1.3.6.1.2.1.2.2.1.21
ifSpecific	1.3.6.1.2.1.2.2.1.22
ifType	1.3.6.1.2.1.2.2.1.3
ifMtu	1.3.6.1.2.1.2.2.1.4
ifSpeed	1.3.6.1.2.1.2.2.1.5
ifPhysAddress	1.3.6.1.2.1.2.2.1.6
ifAdminStatus	1.3.6.1.2.1.2.2.1.7
ifOperStatus	1.3.6.1.2.1.2.2.1.8
ifLastChange	1.3.6.1.2.1.2.2.1.9
ip	1.3.6.1.2.1.4
ipForwarding	1.3.6.1.2.1.4.1
ipOutRequests	1.3.6.1.2.1.4.10
ipOutDiscards	1.3.6.1.2.1.4.11
ipOutNoRoutes	1.3.6.1.2.1.4.12
ipReasmTimeout	1.3.6.1.2.1.4.13
ipReasmReqds	1.3.6.1.2.1.4.14
ipReasmOKs	1.3.6.1.2.1.4.15

Object name	Object identifier
ipReasmFails	1.3.6.1.2.1.4.16
ipFragOKs	1.3.6.1.2.1.4.17
ipFragFails	1.3.6.1.2.1.4.18
ipFragCreates	1.3.6.1.2.1.4.19
ipDefaultTTL	1.3.6.1.2.1.4.2
ipAddrTable	1.3.6.1.2.1.4.20
ipAddrEntry	1.3.6.1.2.1.4.20.1
ipAdEntAddr	1.3.6.1.2.1.4.20.1.1
ipAdEntIfIndex	1.3.6.1.2.1.4.20.1.2
ipAdEntNetMask	1.3.6.1.2.1.4.20.1.3
ipAdEntBcastAddr	1.3.6.1.2.1.4.20.1.4
ipAdEntReasmMaxSize	1.3.6.1.2.1.4.20.1.5
ipRouteTable	1.3.6.1.2.1.4.21
ipRouteEntry	1.3.6.1.2.1.4.21.1
ipRouteDest	1.3.6.1.2.1.4.21.1.1
ipRouteAge	1.3.6.1.2.1.4.21.1.10
ipRouteMask	1.3.6.1.2.1.4.21.1.11
ipRouteMetric5	1.3.6.1.2.1.4.21.1.12
ipRouteInfo	1.3.6.1.2.1.4.21.1.13
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PDU identity table

Two new tables are supported in the PDU section of the CPQ POWER MIB. These two tables are supported for both the 30- and 60-amp PDUs, but not for the HP Intelligent Modular PDU Managed Extension Bar.

The PDU identity table has general PDU information. The table contains two rows that match the two PDM ports on the SL-APM. If a port is not populated with the PDU, then that row in the SNMP table contains blanks or zeros, depending on whether it is a string or a numeric value.

Item	Description
pduName	PDU asset tag. You can set this value through the CLI. However, you cannot set this value through SNMP, even though the MIB defines this value as read/writer.
pduModel	Factory programmed
pduManufacturer	HP
pduPartNumber	Factory programmed
pduSerialNumber	Factory programmed
pduControllable	1.3.6.1.2.1.1.4

PDU input table

The PDU input table is the second table supported in the PDU section of the CPQPOWER MIB.

This table contains two columns, but eight rows. The two columns are inputVoltage and inputCurrent. The PDU does not support inputVoltage, but it supports inputCurrent.

The PDU input is three-phase power, but each PDU will list four inputs. The first three inputs are the three respective phases and the last “input” is the neutral wire.

The PDU input table has eight rows because the first four (rows 1 to 4) correspond to a PDU plugged into SL-APM port PDM1 and the last four (rows 5 to 8) correspond to a PDU plugged into SL-APM port PDM2. If a power distribution module port does not have a PDU plugged into it (or another device) those rows will return 0 for their input current values.

Support and other resources

Before you contact HP

Be sure to have the following information available before you call HP:

- Active Health System log

  Download and have available an Active Health System log for 3 days before the failure was detected. For more information, see the *HP iLO 4 User Guide* or *HP Intelligent Provisioning User Guide* on the HP website (http://www.hp.com/go/ilo/docs).

- Onboard Administrator SHOW ALL report (for HP BladeSystem products only)

  For more information on obtaining the Onboard Administrator SHOW ALL report, see the HP website (http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&objectID=c02843807).

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error messages
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For United States and worldwide contact information, see the Contact HP website (http://www.hp.com/go/assistance).

In the United States:

- To contact HP by phone, call 1-800-334-5144. For continuous quality improvement, calls may be recorded or monitored.
- If you have purchased a Care Pack (service upgrade), see the Support & Drivers website (http://www8.hp.com/us/en/support-drivers.html). If the problem cannot be resolved at the website, call 1-800-633-3600. For more information about Care Packs, see the HP website (http://pro-aq-sama.houston.hp.com/services/cache/10950-0-0-225-121.html).

Acronyms and abbreviations

DHCP

Dynamic Host Configuration Protocol

FQDN

Fully Qualified Domain Name

SL-APM

HP ProLiant SL Advanced Power Manager

SSH

Secure Shell

TFTP

Trivial File Transfer Protocol

UID

unit identification

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